THE AMERICAN
JOURNAL OF PHARMACY.

FEBRUARY, 1877.

THE METRICAL SYSTEM IN PRESCRIPTIONS.

By John M. Maisch.

(*Read at the Pharmaceutical Meeting January* 16, 1877.)

Under the above title, Dr. Albert N. Blodgett of Boston has communicated a paper to the Boston "Medical and Surgical Journal" of Dec. 21, which was also copied, without comment, in the "Druggists' Circular" for January. The avowed purpose of Dr. Blodgett's article is to comment upon a paper, written by me for the "Medical and Surgical Reporter" of Philadelphia, Sept. 9, 1876, and republished in the October number, 1876, of the "Am. Jour. Pharm.," in which I endeavored to show how, with little trouble on the part of physicians, not only the solid articles, but likewise the liquid preparations of our present "Pharmacopœia" might be prescribed by metric weights. The latter part of my subject is the main, perhaps the only fault, which Dr. Blodgett has to find with my paper, and which he criticizes as follows: "The guide which most physicians follow in prescribing liquids is the volume of the liquid employed; and this principle finds a ready and simple application in the metrical system as adopted in the larger universities and hospitals of Europe where this system is in use, as well as in the hands of scientific men generally in those countries—a fact which I am sorry Professor Maisch has overlooked."

Now, in discussing the use of the metrical system in *prescriptions*, the question should not be mixed up with the manner in which that system is employed in the various arts and sciences. I am well aware that *measures* are at the present time more frequently employed in chemical assays than weights, and have employed them myself for many years; but as to their use in pharmacy, it is stated in my paper above referred to that "*the Pharmacopœias of Continental Europe and the prescriptions of physicians in those countries express all quantities by weight only, whether the material directed be solid or liquid.*" In the pas-

sage quoted before, Dr. Blodgett hints at a different practice *in the larger universities and hospitals of Europe*, and in another place makes the statement that "the druggist is expected to know how to dispense the articles without the special signs gmm. or cc., and to understand solids as prescribed in grams and *liquids in cubic centimetres*." Let us examine the correctness of these assertions.

Professor Dr. Carl D. von Schroff, of the University of Vienna, in his valuable "Lehrbuch der Pharmacologie" uses the following language: "The doses of medicines are measured by *weight*" (Die Arzneigabe messen wir nach dem Gewichte); and again: "Liquid medicines likewise are very properly measured *by weight*" (Auch die flüssigen Arzneien werden mit Recht durch das Gewicht gemessen). Dr. Hager in his "Erster Unterricht des Pharmaceuten" explains the manner of weighing liquids correctly, and very properly remarks that "an excess of one in mixtures is a loss and indicative of negligence (lüderliche Arbeit);" also that "an exact and conscientious apothecary *weighs always correctly*." Prof. A. Andouard of Nantes remarks in his "Eléments de Pharmacie" that the prescribing *by drops* is defective, and should always be replaced by prescribing *by weights*, the only method by which errors in doses can be avoided (La prescription médicale par goutte est défectueuse et devrait toujours être remplacée par la prescription en poids, la seule qui ne puisse donner lieu à des erreurs de dosage).

The use of *weights only* in the making of pharmaceutical preparations and in the dispensing of prescriptions is so well established throughout all Europe, with the sole exception of Great Britain, that since the adoption in medicine of the metrical system by the different nations of Europe, the proportions of the various ingredients in formulas and prescriptions are usually given in figures only, because every interested person understands that these figures represent grams *in all cases*, and not merely grams for solids and cubic centimetres for liquids. For this reason, the designation *gram* is usually not met with; but the observant peruser of European pharmaceutical and medical literature may glean from many incidental remarks that weights alone are intended in all cases, unless otherwise directed. Dorvault's "l'Officine" (8th edition, 1872) contains numerous formulas from the various pharmacopœias, formerly officinal in Great Britain, and in all cases the weights and measures have been calculated in the approximate gram-values; nevertheless the

word gram is never employed in any formula, unless another weight value besides gram has been given, as for instance in the formula for *pyroléine de colza* (p. 549), for the preparation of which *Huile de colza* 500 *kil.*, *Minium* 250 *gr.* are directed. If measures are intended instead of weights, they are always specially indicated, like in the formula for alcoholic hydrocyanic acid (p. 209) which reads: *Acide cyanhydrique anhydre* 1 *volume*, *Alcool* 6 *volumes*. That the same rule holds good also for prescriptions may be easily learned from the introductory remarks to the chapter on potions (pp. 741, 742), where the *weight* of the ingredients and of the medicine is three or four times referred to, as for instance in the following sentence: If a potion consists only of a mixture of one or several syrups with medicated waters or ptisans, the syrups are first weighed and afterwards the water (Lorsqu'une potion ne consiste que dans un mélange d'un ou plusieurs sirops avec des hydrolats ou des hydrolés, on *pèse* d'abord les sirops, puis les eaux).

Prof. E. Soubeiran says on the same subject in his "Traité de Pharmacie" (edit. 1847, I, p. 219): Ordinarily there enter into the composition of potions a syrup in the quantity of 30 to 60 grams, distilled waters, vegetable infusions in the quantity of 60 to 120 grams (Il entre ordinairement dans la composition des potions un sirop à la dose de 30 à 60 grammes, des eaux distillés, des infusions végétales à la dose de 60 à 120 grammes).

The medical and pharmaceutical literature of the continent of Europe bears abundant evidence that prescriptions and formulas are always given by weight, and when they are copied from English or American periodicals, the values are usually translated in grams. If further proof was needed, it may be mentioned that the posological tables appended to the recent pharmacopœias of continental Europe give the doses invariably in the metric weight, as they formerly did in grains, but never in metric measures, as the following few quotations from the table of maximum doses of the German "Pharmacopœia" will prove:

	Grammata Pro dosi.	Pro die.		Grammata Pro dosi.	Pro die.
Kreosotum, . .	. 0·05	0·2	Tinctura Cantharidum,	. 0·5	1·5
Liquor Kali arsenicosi, .	0·4	2·0	Tinctura Iodi, . .	0·3	1·2
Oleum Crotonis, .	. 0·06	0·3	Tinctura Opii simplex,	. 1·5	5·0

"In giving ol. ricini," says Dr. Blodgett, "nobody estimates the dose by its absolute weight in grains on the scale." If this is intended to refer to the patient, nobody will object; but if to the physician and

pharmacist, Dr. Blodgett is decidedly in error. Says Dorvault (p. 543): "It is frequently given as a mild purgative in the dose of 15 to 60 grams." (On l'emploie fréquemment comme purgatif doux, à la dose de 15 à 60 grammes.) The fact is that physicians and pharmacists, who study in Europe, are taught and become acquainted with the doses of all drugs, chemical and galenical preparations *by weight only*, and for the former to prescribe by measures would involve the same amount of labor that Dr. Blodgett objects to would be entailed upon our physicians, if they were to follow the plan proposed by me in the previous paper. But it should be remembered that any change of an established system will cause some inconvenience, until the new system has gained a firm foothold, when its use will be found quite as convenient—and in the case under discussion even more so—than the one which preceded it.

The greater convenience and correctness of weights have long since been recognized in the wholesale drug trade. Acids, copaiba, Peru balsam, volatile oils and medicinal spirits are always sold by weight, and within a few years the practice of selling castor oil by the gallon was, to the satisfaction of all dealers, changed to that by the pound. Our "Pharmacopœia" even recognizes the correctness of this fact by having changed, in the last two revisions, all measures of the liquid acids, of chloroform, olive oil and honey into weights. If these liquids are more conveniently and correctly handled by weight, why not likewise glycerin, syrups, tinctures, ethers, etc.? And if a change to the metric system is to be made in pharmacy and medicine, why not make it at once far enough, instead of halting half way, which would render another change in the future necessary?

But it might be urged that chemical analysis is nowadays more extensively performed by the volumetric than by the gravimetric method. While admitting the correctness of this preference, it should be borne in mind that the test liquids—special cases excepted—are all aqueous solutions, which show a like expansion and contraction with the rising and falling variation from the normal temperature. Such is not the case with the various liquids which are medicinally employed; and the relative weights of liquids entering into a mixture and measured at different temperatures, must therefore, necessarily, vary, even if they had been measured with instruments constructed like the pipettes and burettes employed in volumetric analysis, instruments

which are entirely impracticable for the dispensing of most medicinal liquids; and that the probable errors of reading from the graduated measures, as usually constructed for pharmacists, are much larger and increase with the quantity, must be evident to every intelligent observer.

To these considerations must be added some other very important ones, namely, the great volatility of some liquids at ordinary temperatures, and the tenacious adhesion of others to the graduated vessels. The dispensing of liquids by weight offers, for all the reasons advanced, by far greater accuracy than could be attained by measures, even if they were constructed upon the same principle as burettes and pipettes; and that the difficulties of dispensing by weight are not greater than by the use of measures will readily be acknowledged by those who have *accustomed* themselves to the former practice, and this, it seems to me, will become the duty of American apothecaries in the near future.

The physician now in practice will encounter some difficulties in adapting his knowledge and experience to the change under consideration, and to aid him in this, and show that it must not be considered an impossible task, even with our present "Pharmacopœia," was one of the main objects of my previous paper; after the metric system shall have been fully recognized in medicine and pharmacy, the students of both medicine and pharmacy will learn the proper doses of all drugs and preparations by weight, and consequently prescribe and dispense them thus.

A common oversight by many physicians may here be incidentally alluded to, namely, the fact that solids dissolved in liquids occupy a certain space, depending in part upon their own specific gravity and upon the nature and quantity of the solvent. On the other hand, it is frequently overlooked that on mixing certain liquids a contraction takes place, as in the case of alcohol or concentrated acids with water. No uniformly applicable rule can be given for these occurrences, and in most cases the difference in the expected measure falls within the variations of the approximate measures to which the patient has recourse. For the salts of the alkalies, alkaline earths and even the lighter metals, it may be assumed that in solution they occupy the space of about one-third their weight of water. This is not absolutely correct, but it is very convenient and sufficiently approximate for calculating the dose. Dr. Blodgett gives a formula for potass. brom., grm. 12; syr. simpl., aq. font., āā cc. 60, which it seems was expected

to measure 120 cubic centimetres, or 8 tablespoonfuls; in reality, however, it will be found to measure rather more than 123 cubic centimetres, an excess of about $2\frac{1}{2}$ per cent. over the expected volume. If such a prescription, without the signs *grm.* and *cc.*, was dispensed by a pharmacist conversant with the practice of continental Europe, it would measure a little over 108 cubic centimetres, a deficiency of $9\frac{3}{4}$ per cent. of the expected volume, equal to a difference of about 7 per cent. between the variations from the expected measure, the combined difference being $12\frac{1}{4}$ per cent., or less than the variation in the approximate measure of the tablespoonful, which is usually assumed to be 15 cubic centimetres (about half a fluidounce), while the French "Codex" gives it at 20 grams (or cubic centimetres) of water, a difference of 33 per cent. on the smaller, and of 25 per cent. on the larger measure.

In this connection it may not be out of place to mention some typographical errors, which, however, are easily recognized as such. In Dr. Blodgett's paper, as published in both journals mentioned above, it is said that the gram equals in volume 16·2318 minims, or about "quarter of a fluidounce"; this should read, "quarter of a fluid drachm." In the "Proceedings of the Amer. Phar. Assoc.," 1876, p. 677, the writer is made to say that "30 drachms of water make 2 tablespoonfuls, and 40 drachms of syrup about the same measure." The word "drachms," it is obvious, should read, in both cases, "grams."

After all these considerations, it must be quite plain to the physician and pharmacist that, in prescribing by metric weights, with the few simple rules advocated in my previous paper, any variation between the intended and the actual amount of even a potent medicine ordered must, in the approximate apportionment of doses by the patient, naturally fall considerably within the limits of the variation of these approximate measures usually employed; and that, unless *maximum doses* were directed, in which case it would be the special duty of the physician to examine the *approximate measures* on hand, no inconvenience or danger to the patient could result.

In the above I have alluded only to the practice on the continent of Europe; how is it upon the western hemisphere? A paper by Prof. C. G. Wheeler, of Chicago, presented to the Amer. Phar. Assoc. at its last meeting (see "Proceedings," 1876, p. 441) throws some light upon this, and we learn, in the countries named there and probably upon

the entire continent of South America, there is no officially published "Pharmacopœia," but that those of various European nationalities are used. Since Portugal and Spain employ metric weights only in the preparation and dispensing of medicines, it is fair to presume that these are employed almost to the entire exclusion of measures.

Cuba naturally follows the mother-country, Spain, and with the pharmaceutical journal, "La Emulacion," as far back as 1863, before us, we learn that the metric weights have been in use there at that time. The following formulas, taken from that journal of January, 1864, and June, 1865, will show this:

Colodion morfinizada (Collodion with morphia.)

℞. Colodion elástico (flexible collodion), . . 30 gramos
Hydroclorato de morfina (muriate of morphia), . 1 gramo
H. s. a. (Mix according to art).

Electuario antiblenorragica (Antiblennorrhagic Electuary).

℞. Tanato manganico (tannate of manganese), . 25 centígramos
Polvos de cubeba (powdered cubebs), . . 30 gramos
Bálsamo de copaiba (copaiva), . . 30 gramos
M. Mix.

Pocion contra la metrorragia (Potion against metrorrhagia).

℞. Cocimiento de salep (decoction of salep), . 200 gramos
Acido phosphorico (phosphoric acid), . . 5 idem
Jarabe de frambruesas (syrup of raspberry), . 20 idem
Una cucharada cada media hora (a spoonful every half an hour).

As far as the writer is informed, besides the United States "Pharmacopœia," there has been only one national "Pharmacopœia" issued on this side of the Atlantic, the latest edition of that work being the "Nueva Farmacopea Mexicana," published in Mexico in 1874. As might have been expected, this work leans on the similar issues of southwestern Europe, and is a production very creditable to the pharmaceutical society by which it was issued. That there, also, weights alone are employed, to the exclusion of measures, will be seen from the following formulas copied from the "Farmacopea," to which, as in the preceding case, the English translations are added:

Alcoholato de Canela (Alcoholatum corticis Cinnamoni).

Canela de Ceylan (Ceylon cinnamon), . . quinientos gram. 500
Alcohol de 80° (80 per cent. alcohol), . . cuatro-mil gram. 4000

Hágase macerar la canela en el alcohol por cuatro dias y destílese en B. M. hasta obtener toda la parte espirituosa (Macerate the cinnamon in the alcohol for four days, and distil, by means of a water-bath, until the whole of the spirituous portion has been obtained).

Tintura de Iodo (Tinctura Iodii).

Iodo (Iodine), ...	diez gram.	10
Alcohol de 90° (90 per cent. alcohol), .	ciente-veinte gram.	120

Disuélvase y filtrese (Dissolve and filter).

Agua de Subacetato de Plomo de Goulard (Aqua cum Subacetate Plumbico ex Goulard).

Subacetato de plomo liquido (solution of subacetate of lead),	quince gram.	15
Agua comun (common water), ...	quinientos gram.	500
Alcoholato de Colonia (Cologne water), . .	treinte gram.	30

Reemplazando el agua de Colonia con la misma cantidad de alcohol alcanforado, se tiene el *Agua végeto-alcanforada* (By replacing the Cologne water with the same quantity of camphorated alcohol, the *vegeto-camphorated water* is obtained).

It will be evident from the above that the extent of the countries in which the metric weights are employed in medicine and pharmacy far exceeds that in which the troyounce and measures are used. To do away with these differences, it appears to me, is the aim at the introduction of the metric system; that weights alone are the proper medium for dispensing medicines is no fault or advantage of the system; nor do I conceive the unit to be of any special advantage, except in so far that it bears a simple and easily comprehended relation to the units of length and capacity. Whether the length of the meter has been correctly ascertained or not, is not a question to be considered in this respect, nor how far the unit is divisible by two; no system can be devised which can be indefinitely divided without fractions. To simplify the commercial not only, but also the intellectual intercourse between the intelligent nations of the earth, is among the primary objects of the movement, in the successful accomplishment of which every physician and pharmacist may and let us hope will take an active part. And as to the special advantages of the metric system, I may be permitted to quote from the concluding paragraph of Dr. Blodgett's paper: "It dispenses with the signs of the quantities; it employs Arabic figures instead of Roman numerals; it assures the physician of more competent service from the pharmacist, and of a better quality of medicines; and, last but not least, it reduces considerably the danger of mistakes on the part of physician and of druggist."

This paper has grown far beyond the limits originally designed for it; in its preparation so many points appeared to present themselves, requiring at least a passing notice, that the writer has to ask the indulgence of the peruser, in the hope that some medical and pharmaceutical matters, which appear as yet to be less understood than they deserve to be, may hereafter attract more attention; and if he has succeeded to awaken the interest of others, he will consider himself amply repaid for the labor.

ADULTERATIONS.

By Adolph W. Miller, M.D. Ph.D.

(*Read at the Pharmaceutical Meeting January 16th, 1877.*)

Some extraordinary accounts of falsification of drugs and chemicals having recently come to the notice of the writer, it is deemed advisable to place an account of them on record. While they embrace perhaps nothing that is absolutely new, the subject is presented in a new phase in so far as it relates to most villainous frauds practised on suffering humanity by apparently respectable druggists, whose only plausible excuse for these rascalities seems to be excessive and ruinous competition in business. It may be prefaced that these statements are not mere hearsay testimony, but that most of them are derived from parties having an actual knowledge of the transactions referred to.

Oregon balsam of fir (so-called) appeared in the New York market several years ago. Prof. Maisch then examined it, pronounced it to be of suspicious appearance, and raised the query: "Is such an article known on our Pacific coast, and if so, what is its source, and how is it obtained?" ("Am. Jour. Pharm.," 1874, p. 106.) This inquiry can now be answered by stating that the article in question emanated from St. Louis, Mo., where it was manufactured by carefully melting two parts of the finest select white rosin with one part oil of turpentine. A small amount, generally about one ounce to five gallons, of oil of wormwood was subsequently added, this having been found to be most efficacious in completely disguising the ordinary terebinthinate odor. The "balsam" was then shipped to a prominent New York broker, who succeeded in selling considerable quantities of it, as the genuine article happened to be at that time unusually scarce and high-priced.

Sulphate of quinia, put up in the usual style of the American manufacturers, has heretofore been regarded as being above reproach. Even our lately much abused dealers in *pure* essential oils of New York, contented themselves with operations in Pelletier's French quinia. My information is to the effect that a year or two ago in one of our Western cities the labels of American manufacturers were deliberately soaked off, after which an admixture of salicin was introduced. The label was then replaced and the article disposed of. Another somewhat more enterprising dealer in the same city had muriate of cinchonia manufactured on his own premises and used this to adulterate sulphate

of quinia to a large extent. In this case the preparation was put up in tin cans, without bearing the name of any manufacturer.

Italian essential oils, chiefly lemon and bergamot, were imported by a Western druggist to the extent of 100 cans in one lot. They were opened, sophisticated to an enormous extent, and again closed with false seals and brands.

While in the East, the adulteration of cream of tartar is almost entirely confined to grocers and spice mills, in the West the wholesale druggists also seem to indulge extensively in this fraud.

The labels and wrappers of English calomel have been successfully imitated in the West, and large amounts of this pseudo-imported chemical have been there disposed of.

If it be not deemed inappropriate to draw a moral from the above facts, which are vouched for by the parties best qualified to do so, this would embrace chiefly two points, namely, an injunction to continued vigilance and close scrutiny of all substances that can be adulterated, and also an appeal for a little more liberality in making purchases. It seems to be conceded that the minimum running expenses of carrying on the wholesale drug business are from 5 to 8 per cent. of the sales; the expense of salesmen varies, usually, from 5 to 25 per cent. of the amount of their sales, 10 per cent. being perhaps a low average. A little calculation will therefore suffice to show that when goods are sold direct to consumers at less than 10 per cent. margin, or through the instrumentality of traveling salesmen at less than 20 per cent. profit, the inference may be fairly drawn that there are just grounds for suspicion in the case.

NOTE ON SYRUP OF IODIDE OF IRON.

By H. P. Reynolds.

The formula of the "U. S. P." for syrup of iodide of iron, if exactly followed, yields, invariably, a satisfactory product, which, in well filled and stoppered bottles, keeps almost indefinitely and is entirely indifferent to indirect light. The bottle once opened, however, the slight access of air causes the contents to darken, from the surface downward, and it soon becomes unfit to dispense. To remedy this discoloration, the late Prof. F. F. Mayer has recommended the addition of hyposulphite of soda, others the use of citric and of hypophosphorous acids, and the placing in the syrup of bright metallic iron has proved useful.

There are, perhaps, reasonable objections to all but the latter method, and I venture to offer another, which, so far, seems quite effectual, and which is at any rate new to me, though it may not be so to other readers of the "Journal." If the bottle containing the darkened syrup be placed in a water-bath and brought to the boiling point,[1] the discoloration disappears, the syrup assumes its normal appearance and, if as cautiously preserved as at first, will retain it as well, so far as observed. A sample now before me, thus treated two months ago, being at that time of a dark cherry color, seems now "as good as new." The remnants of syrup left in bottles that have been opened may be collected into one full bottle, thus conveniently restored, and satisfactorily dispensed.

There does not seem to be any evolution of iodine during the heating, and the restoration is probably due to a recombination of separated elements.

Plainfield, N. J., January 3, 1877.

NON-ACTINIC GLASSWARE.

By Hans M. Wilder.

In drug stores are to be found a good many substances (not only chemicals but also galenical preparations) which are very sensitive to light, and much ingenuity has been bestowed upon devices for excluding light. The first thing that suggested itself was to keep such articles in dark closets; these not always being practicable the next thing was to wrap or paste black or dark-colored paper round the respective bottles. This served its purpose perfectly, but did not look nice; then bottles made from black glass (hyalith) were introduced and were in use for many years, having only one drawback, that it was impossible to inspect their contents except by pouring out. This led to the desire to substitute some other color which permitted inspection and, at the same time, guarded the contents against the chemical action of the solar light. Blue, itself a dark color, was next hit upon, under the mistaken notion that it would be as effectual as black, with the advantage of permitting examination of its contents. Unhappily, blue was the worst color which could be selected, and it is a wonder

[1] This process has been recommended by M. E. Fougera, of New York, in 1860; see "Amer. Jour. Phar.," 1860, p. 22.—Editor.

that said notion still prevails, although physicists, many years ago, have proved that chemical action is intimately connected with the blue rays.

The solar spectrum, as is well known, consists of several colors, ranging from violet in the one end to red in the other end; by further examination it has been proved that, while the greatest heat is found in the red end, the violet end possesses the greatest chemical action. Thus, while red, yellow or orange rays give light enough to see by, for chemically sensitive substances they are equivalent to darkness. Further, we know that when we pass solar light through a colored glass it simply intercepts all rays which are not of the color of the glass, that is to say, we filter away a large portion of the light with the peculiar properties pertaining to it; consequently we have to employ a color which strains, as it were, the light from the rays which we wish to exclude.

Red glass, being chemically most inactive, was first tried, but being quite expensive it was only employed occasionally; yellow glass next had its share of attention, but laboring under the same defect (chloride of silver giving the purest yellow) it was discarded and people returned to black and blue glass. In the meantime a cheap substitute for black glass was extensively used, viz.: painting bottles with asphaltum varnish, which answered perfectly, being black by reflected light, and still sufficiently transparent to enable one to examine the contents. On observing that the said varnish, in thin layers and by transmitted light, had an amber-yellow color it was thought that dark-yellow glass, which is quite cheap, might be used, so much the more as it was more elegant.

This dark-yellow glass is produced by carbon (by adding to the melted glass either refuse organic matter or finely powdered coke); Splitgerber (Dingler cxxxviii, 292) recommends a small percentage ($\frac{3}{10}$ per cent.) of sulphur ($1\frac{3}{4}$ per cent. sulphate of soda with a little sugar) to white glass. E. Becquerel ("Annales de Chim. et de Phys.," 1843, ix, 263, etc.,) proved that mere traces of finely divided particles completely cut off the chemical rays.

Messrs. Whitall, Tatum & Co., of Philadelphia, were induced to manufacture such glass, and it can now be had at the same price as flint glass bottles.

The "Danish Pharmacopœia," of 1868, was the first (and, as far as known to the writer, still the only one) to direct the use of either

black or yellow bottles for sensitive substances, as chlorine water, calomel, white precipitate and the two iodides of mercury. The writer has kept both chlorine water and sulphuretted hydrogen water for weeks in such bottles, exposed to daylight, without losing their activity. A solution of nitrate of silver has purposely been kept in the show-window (exposed to an occasional sun) for some weeks, and was found as clear the last day as when first made. Powdered savin and digitalis, so prone to change their green color to a dirty yellow, keep very well in yellow bottles. Will it take more than one decade before we see new stores fitted up with amber glass-ware throughout instead of white?

Those desirous of ascertaining the power of a colored glass to exclude obnoxious rays can do so by following Le Nêve Foster ("Brit. Jl. of Phot.") If upon a dead-black support is placed a narrow strip of white paper and on top of that a glass prism, the colored rays of the spectrum will be seen; if now a colored glass be placed between the prism and the paper, those rays which the glass absorbs will have disappeared.

Becquerel mentions a curious property of the red rays, that they continue chemical changes if only commenced by the blue rays; which property has been taken advantage of by the earlier daguerreotypists to shorten the time of sitting. The same author mentions (loc. cit., p. 268, note) that Herschel has found the rays which destroy a vegetable color to have the same refractive power as those rays which are of a color complementary to that of the vegetable.

Note by the Editor.—It is often stated that brown-yellow glass owes its color to finely divided carbon; but Pelouze has shown (1865) that the same color is produced also by silicon, boron, aluminium, calcium phosphide and selenium, and depends upon the formation of an alkaline sulphide from the sulphates present. In regard to the action of light upon solutions of nitrate of silver it is quite possible that the amber-colored glass may prevent its reduction in the presence of organic matter; but solutions which are free from the latter will keep equally well in glass stoppered flint glass bottles.

CRYOLITE AND ITS USES.

By Willis Brenton, Ph.G.

(*From an Inaugural Essay presented to the Philadelphia College of Pharmacy.*)

The natural deposits of cryolite of any importance, as far as known, are in the Ural mountains between Russia and Siberia and on the western coast of Greenland, the latter being the great source of our cryolite and the only place where it is mined and exported to any great extent. The deposits at Miask in the Ural mountains are comparatively small and quite impure, in combination with mica, fluor spar, etc., and being so far from civilization—in a mountainous wilderness, with very poor natural facilities for transportation, they have not as yet been of any particular use to the world.

The Greenland deposits are remarkably pure and quite accessible. The veins, of a depth of 80 feet usually, are near the surface and extend along the cliffs for many hundred feet. At this place the Danish government has established a colony, and the mineral is extensively mined and shipped to Denmark, and also to the United States. It was first brought to notice by a missionary who took specimens to Copenhagen, where it was analyzed and afterward imported as a source of crude soda for use in the manufacture of soaps.

Cryolite is a beautiful mineral. It generally occurs in great white masses, partially transparent, of a crystalline structure, and has very much the appearance of snow-ice, from which it has undoubtedly received its name, the Greek word *kryos* signifying ice. Cryolite has come to be quite an item of commerce in this country, and is now imported in quantities of many thousand tons yearly. For this purpose many vessels are employed. It is not often that a vessel can make more than one voyage a season, on account of the floating ice in the Northern waters. So it must necessarily take quite a fleet to get out sufficient cryolite to supply the great demand. As imported to this country, the mineral contains very few impurities. In fact, I believe there is a contract with the Danish government, and only a certain percentage of impurities are allowed. Each cargo is inspected before unloading, and if not up to the standard is rejected. When it is mined at a good depth, say 80 or 100 feet from the surface, it is very pure, whole cargoes containing but ½ per cent. of impurities. In some of the mines, as they descend, the mineral becomes of a darker color. But a peculiarity about it is that on exposure, or when subjected to heat, the color is entirely dissipated, leaving the cryolite perfectly pure. The

impurities of cryolite generally consist of carbonate of iron and sulphides of copper, iron and lead, the latter in very pretty crystals. In some specimens traces of gold and several rare metals have been found, and quartz crystals occur often in connection with it.

Cryolite, chemically considered, is a double salt of aluminum and sodium with fluorine, the formula being $3NaF.AlF_3$ (Bloxam's chemistry). It can be artificially prepared by mixing calcined alumina and carbonate of soda with an excess of hydrofluoric acid.

Cryolite is not very hard, and can be easily reduced to a fine powder. In this condition, mixed with sand in the proportions of one part to three or four of sand, it has come into use in the manufacture of a beautiful white glass or porcelain ware, which is easily moulded and cut and is remarkable for its tenacity.

It could be used for many purposes if the advantages were sufficient to pay the difference in cost of importation.

As a source of soda, it is very profitable on account of the large percentage which it contains (about 35 per cent.) and the ease with which it is separated. The alumina present in it is no small item, and is now extensively used in the manufacture of the alum salts, which, as prepared from cryolite, are quite free from iron, generally containing but a trace. In the manufacture of the metal aluminum, cryolite has been used to a certain degree. But the process of isolation is not perfect, and I believe does not pay very well. Cryolite is insoluble in water, but when long boiled with lime, decomposition gradually takes place. It is fusible at a red heat, and on cooling forms a kind of glass which is slightly soluble in water. To thoroughly separate the mineral into its constituents it is first necessary to convert it into a soluble compound, which is readily accomplished, in a large way, by first bringing it to a very fine state of division by passing it through a crusher, then through several mills of different degrees of fineness, after which it is passed through sieves and bolting cloth, making it as fine as flour. It is then mixed with about an equal weight of lime, and calcined at a dull red heat in a reverberatory furnace for several hours, when it assumes a grayish appearance, being decomposed into insoluble fluoride of calcium and soluble aluminate of sodium, besides a small percentage of carbonate and hydrate of sodium. These are then separated from the fluoride of calcium by lixiviation with hot water.

On passing carbonic acid gas through the solution, the acid unites with the soda, and the alumina is precipitated, leaving carbonate of sodium in solution. Aluminate of sodium is now manufactured to a considerable extent, and is used in the place of soda and potash lye in the making of soaps, and is considered superior to either as a detergent. Fluoride of calcium, the by-product in the manufacture of soda from cryolite, is used in large quantities as a flux in the reduction of iron, gold and other metals. Taking everything into consideration, the process of making soda from cryolite has many advantages over the old process of making it from barilla, the ash of marine plants of southern Europe, or from kelp, the ash of sea weeds. It generally takes about 24 tons of sea weed to make one ton of barilla or kelp. The percentage of soda in barilla is 25 per cent., and in kelp not over 7 per cent. They are used only in the manufacture of iodine now. About the year 1804, Leblanc discovered and introduced the process of making soda from sea salt or chloride of sodium. It is rather complicated, and consists of heating the salt with sulphuric acid to form sulphate of sodium, roasting this with limestone to convert it into an impure carbonate, which is afterward washed and purified. The extensive soda manufactories of England all make it from salt by this or similar processes, producing bicarbonate often containing more impurities and a smaller percentage of carbonic acid than that produced in in this country from cryolite.

WASH-BLUE AND ITS ANALYSIS.

By H. G. Debrunner.

The different pigments sold as "wash-blue" chiefly consist of Prussian blue, or ferric ferro-cyanide, $(FeCy_6)_3Fe_4+18H_2O$; some of them, however, are prepared by immersing starch in cold solutions of indigo or anilin blue, by which process the pigment is absorbed. The latter kind is not very often met with; indeed, I think there is hardly any in our present market. The former kind of blue, however, on which I made a series of experiments, is found in almost every house, under varying names, often as a dry powder, put up in "patent boxes," sometimes, also, in solution.

Soluble Berlin blue, as the term is used in science, is not found in the market. I am referring to the blue precipitate formed on the addi-

tion of ferric sulphate or chloride to an excess of potassic ferrocyanide. The blue precipitate thus formed contains potassium, and is soluble in distilled water as soon as freed from adhering mother-liquor. Its formation is illustrated by the following equation:

$$2(K_4FeCy_6) + Fe_2Cl_6 = 6KCl + 2(FeCy_6K)Fe_2$$

potass. ferrocyd. + ferric chld. = potass. chld. + sol. blue.

It is precipitated from its solution by shaking it with such indifferent pulverized substances as baric sulphate, and the same effect is produced by hard water and salt solutions, which qualities render it unfit for wash-blue.

The only allied compound which finds application as wash-blue is insoluble in water, and is obtained by the addition of a solution of potassic ferrocyanide, $K_4FeCy_6+3H_2O$, to an equal quantity of copperas, $FeSO_4+7H_2O$, also dissolved, and subsequent treatment of the white precipitate ($K_2Fe_5C_{12}N_{12}$) with a mixture of nitric and sulphuric acids. The product of this process is insoluble in water; it will, however, readily dissolve in solutions of ammonic tartrate, oxalic acid and potassic ferro-cyanide. Only the latter two solvents are of practical importance. Oxalic acid should be used in proportion of about $\frac{1}{6}$ of the weight of the dry blue in order to dissolve it entirely. Since oxalic acid is a poison it is doubtless preferable to substitute it by an equal amount of potassic ferrocyanide, thus obtaining a perfectly harmless product. For the manufacture of blue ink I should prefer the latter solvent already on account of its not corroding steel pens. The addition of the potassic ferrocyanide is done best when the previously formed and oxidized precipitate is sufficiently washed and of the consistency of a thick pulp (60 per cent. water). The mixture then is repeatedly passed through a mill, dried at about 120° F., and ground, when it is ready for sale. 100 lbs. of potassic ferrocyanide thus yield 80 lbs. of dry blue (almost exactly the theoretical amount), which require about 12 lbs. of $K_4FeCy_63H_2O$ to become soluble.

The pigment thus obtained forms a light, dark-blue powder, perfectly soluble in water; in lumps it possesses a handsome bronze tint. The color of the solution is a beautiful blue-violet, similar to the shade obtained by the action of ammoniacal vapors on the pure blue pigment. Sometimes, particularly if precipitated from very dilute "liquors," its solution shows fluorescence. It cannot be denied that the cost of this blue is higher than that of the one rendered soluble by oxalic acid.

The "patent" boxes, however, it is sold in contain such homœopathic quantities (average 60 grains, sold at ten cents) that the cost of package and label far surpasses that of the contents, still leaving a fair profit to the wholesale manufacturer.

The greater number of the "wash-blues" in the market contain oxalic acid, the detection of which is by no means so easy a matter as might be imagined. It is evident that on addition of calcic acetate not only calcic oxalate will precipitate, but also the Berlin blue, which thus becomes deprived of its solvent. The non-transparency of the solution (except on excessive dilution) neither facilitates a direct reaction. The method which I would propose, and which has given very satisfactory results, as well for the qualitative detection as for the estimation of oxalic acid, in this case is as follows:

About 10 grains of the blue to be tested are heated with caustic soda. The pigment thus becomes converted into sodic ferrocyanide and hydrated ferric oxide, while the oxalic acid will form sodic oxalate. The iron is filtered off and the filtrate acidified with dilute acetic acid. If oxalic acid is present, calcic oxalate at once will precipitate on addition of calcic acetate. As all the circumstances for the formation of ferric or a basic oxalate are present, it is advisable to dissolve the ferric precipitate in a few drops of hydrochloric acid; add sodic acetate and acetic acid to the *cold* solution, which, although assuming a red color, will not form a precipitate of basic acetate of iron except on boiling. On addition of calcic acetate the oxalic acid can be recognized by the precipitation of calcic oxalate, and it may be estimated in the usual manner if a quantitative determination should be desired. Although I have never found oxalic acid in this ferric precipitate, I would recommend not to omit testing for it.

As to the detection of potassic ferrocyanide in wash-blue, I have seen the following test applied, viz.: A few drops ot the concentrated blue solution are dropped on a piece of filtering-paper and allowed to spread. Owing to the capillarity, around the blue spot a colorless wet zone will form, which, although being hardly of the breadth of $\frac{1}{16}$th of an inch, will allow the detection of potassic ferrocyanide on adding to it a drop of a dilute solution of ferric chloride by means of a thin glass rod (formation of Berlin blue).

For confirmation I should recommend the following tests:

If potassic ferrocyanide is contained in a wash-blue, the aqueous extract of its residue on ignition will contain potassic cyanide (silver

reaction AgCy; boiling with a drop of ammonic sulphide and addition of a drop of ferric chloride Fe_2Cl_6—red color). As it takes a very low heat to decompose Berlin blue, said aqueous extract sometimes contains undecomposed potassic ferrocyanide. Test with ferric chloride.

Pure Berlin blue, ferric ferrocyanide, $(FeCy_6)Fe_4+18H_2O$, loses, at 212° F., 7·22 per cent. of water, a fact the manufacturers are well aware of, and therefore never allow the temperature of the "blue drying room" to exceed 100 to 120° F.

On ignition, depending on the intensity of heat, varying mixtures of ferric and magnetic oxide remain as residue. The loss on ignition, therefore, does not allow any conclusions on the quantity of blue present (for instance, in a mineral color), and an estimation of the ferric oxide, either by titration or weight-analysis will always be necessary. It is evident that this method would become incorrect if applied in the quantitative analysis of a blue rendered soluble by potassic ferrocyanide; it, however, can be successfully followed in the estimation of "oxalic acid blues." Wash-blue is hardly ever adulterated.

In order to ascertain the quantitative relation between the ferric oxide and the total quantity of blue I prepared a pure sample by the same process as done on a large scale, and dried it slowly at 80° F. It corresponded to the formula $2[(FeC_6N_6)_34Fe+18H_2O]=2368$, which will yield $7Fe_2O_3=1120$. 100 blue correspond to 47·290 per cent. oxide of iron.

1·00 gram of this pure ferrocyanide of iron lost on ignition 0·6058 = 60·58 per cent. of its weight. Actual residue = 0·3942 = 39·42 per cent. This residue then was dissolved, the Fe reprecipitated as $Fe_2O_3,3H_2O$, and finally weighed as Fe_2O_3 = 0·4750 = 47·50 per cent., nearly the theoretical amount.

From these data the quantity of pure blue can be calculated. I have, however, found that the pure "commercial blues" dried at a somewhat higher temperature, contain less than 18 H_2O, yielding 49·75 to 50 per cent. of Fe_2O_3, and consider it "practically correct" to multiply the quantity of Fe_2O_3 found, by two, in order to find the quantity of "commercial blue" present.

The numerous other blue pigments of this series, as, for instance, *Turnbull's blue* (ferrous ferricyanide, $(Fe_2C_{12}N_{12})Fe_3$), *chromate blue*, so called from potassic bichromate and sulphuric acid forming the oxidiz-

ing agents of the previous white precipitate, $K_2Fe_5C_{12}N_{12}$; *steel blue*, the product obtained on treatment of said white precipitate with hydrochloric acid, etc., are never used as wash-blue, and therefore out of the range of consideration. In this connection I desire to express my thanks to Mr. John F. Grossklaus, who kindly assisted me in these investigations.

Navarre, O., Jan. 15, 1877.

PREPARATION OF MEDICINAL PEARLS.

(*Translated from Hager's "Hand-book of Pharmaceutical Practice,"* 1876.)

The mass for forming the capsules consists of gelatin, gum Arabic, sugar and honey. This is rolled out into sheets of suitable thickness. One of these sheets is placed on top of an iron plate having a thickness of 0·6 centimetre, into which holes of a diameter of 1 centimetre have been bored. The gelatinous mass, while still pliant, sinks into these holes by its own gravity, forming a hollow hemisphere in each concavity. The ether or other medical preparation is then introduced, and the orifices are closed by another sheet of the gelatinous compound.

A second iron plate, furnished with holes corresponding exactly to those of the first, is now applied and securely fastened by suitable screws. The whole apparatus is now reversed in such a manner that the superior plate assumes the inferior position. Concavities will thus be formed in the second sheet of gelatin in the same manner as they previously were in the first. In order finally to separate the pearls, the entire arrangement is subjected to strong compression between iron plates in a powerful press. A. W. M.

GLEANINGS FROM THE FOREIGN JOURNALS.

By the Editor.

Coloring Matter from Phenol.—If a mixture of 3 parts of sulphuric acid and 2 parts each of glycerin and phenol is kept for some time at a temperature of 120 to 130° C. (248 to 266° F.), it will gradually turn to a dark-red color, and, on being dissolved in water, hydrochloric acid will precipitate the coloring matter as a dark-brown powder, which is sparingly soluble in ether, and not crystallizable from its alcoholic or aqueous solution. Alkalies and alkaline salts color it handsomely red; baryta, alumina and lead oxide unite with it to form

lakes. When heated with anilin a red color is produced. It dyes silk and wool.

Thymol and pyrogallic acid yield coloring matters like phenol.—C. Reichl in *Ber. deutsch. Chem. Ges.*, 1876, p. 1429.

The secretion of salicylic acid is effected, according to one view, by combination with the salts of blood in the form of salicylates. Freser and Friedberger assume a combination with the albuminates of the blood, which, shortly before the excretion, is converted into salicylates. Binz believes in the first theory, and regards the salicylates of the blood as being decomposed by the carbonic acid generated in the tissues.

R. Fleischer regards the first view as the most correct one. Pure sodium salicylate is insoluble in ether, but on evaporation of the ether, after shaking it with a solution of the salt, reactions for salicylic acid may be obtained, though no residue is observed. This is due to the presence in the ether of minute traces of acetic acid. Neither carbonic nor acetic acid liberate salicylic acid from solutions of its salts, except in the presence of ether; on the contrary, salicylic acid liberates acetic acid from its salts, and, in contact with the so-called neutral sodium phosphate, forms salicylate and acid phosphate of sodium; however, on concentrating the solution containing these two salts, the neutral phosphate and free salicylic acid are again produced.—*Chem. Centralbl.*, 1876, No. 45.

Artificial oil of bitter almonds, prepared from toluol, by Wilhelmi, of Leipzig, has been examined, by E. Lippmann and Jos. Hawliczek, and compared with true oil of bitter almonds, which had been freed from hydrocyanic acid by distillation with milk of lime and ferrous sulphate; the artificial and natural oil were found to be identical, chemically as well as physically. They boiled between 178 and 180° C (352·4 and 356° F.); the benzyliden chloride, prepared from both, had the same boiling point (203–204°C.) and the same elementary composition ($C_7H_6Cl_2$); the benzoic acid prepared from both, by three different processes, had the fusing point (121° C.) and other properties of ordinary benzoic acid, and various ethers obtained from the two were identical. The specific gravity of the artificial oil at 0° C. was found to be 1·067, which agrees with the density (1·063) of the benzaldehyd from the natural oil, determined by H. Kopp.—*Ber. deutsch. Chem. Ges.*, 1876, p. 1461–1463.

Doctored Herbs.—A writer in the "Schweiz. Wochenschr. f. Phar.," 1876, No. 51, reports having met with some herbs, notably with melissa and mint, the odor of which suggested a fraudulent impregnation with volatile oil. To determine whether such was the case the following experiments were made: 30 grams each of the suspected herb, of an old herb sprinkled with a few drops of volatile oil and of a recently picked herb were macerated in a cool place with half a liter of water for 24 hours, then strained and the infusions mixed with a few grams of ether and set aside in a vessel covered with a well-fitting glass plate. After an hour the under side of the glass cover of the three liquids first showed the odor of ether, followed in the suspected and old herbs by the odor of the essential oil, which could not be perceived in the case of the fresh herb.

Boswellia serrata yields a gum resin, called *gugal* in India. It occurs in irregular lumps, to which the papery or thick inner bark sometimes adheres, greenish-yellow, occasionally with a red tinge; consistence waxy, becoming brittle; odor peculiar, balsamic, gradually diminished; taste bitter and balsamic; forms with water a greyish-white emulsion. Gugal is principally used as an incense, and has on this account been confounded with olibanum.—*Pharm. Jour. and Trans.*, Sept. 2, 1876.

Coto Barks.—Jul. Jobst has received a coto bark which was procured from the banks of the Mapiri river, in Bolivia, and showed some differences from the bark previously obtained under that name ("Am. Jour. Phar.," 1875, p. 541). By the process for cotoin (*ibid.*, 1876, p. 352), a compound crystallizing in yellow scales was obtained, which is called *paracotoin*, and differs from cotoin in not possessing a biting taste; in being less soluble in water, alcohol, ether, ammonia and potassa solution; in being not precipitated by lead acetate, and in yielding with nitric acid a yellow solution. Dr. Burkart, of Stuttgart, has found the new body quite as valuable a remedy in diarrhœa as cotoin; only somewhat larger doses were required. It is best given in the form of powder, triturated with sugar, 0·1 gram being used every three hours.—*Phar. Zeitung*, 1876, No. 98.

Constituents of Angelica Root.—Dr. C. Brimmer has examined some of the constituents of this root, and comes to the conclusion that Buchner's *angelicin*, when purified by repeated crystallizations, is tasteless and identical with Husemann's hydrocarotin; the *angelica*

sugar is cane sugar, and the *resin*, when added to fusing potassium hydrate, yielded resorcin, protocatechuic acid and volatile fatty acids, principally acetic acid.—*Liebig's Annal.*, vol. 180, p. 269–282.

Sulphate of Quinia, when exposed to the air, loses water of crystallization until its composition is $(C_{20}H_{24}N_2O_2)_2H_2SO_4+2H_2O$. It then retains 4·6 per cent. of water, which is entirely expelled at 100°C. The anhydrous quinia sulphate, when exposed to the air, rapidly absorbs again the whole amount of this water, acquiring the same composition as the air-dry salt.—*Phar. Jour. and Trans.*, Sept. 2, 1876.

Acetate of Morphia, when freshly prepared, is easily and completely soluble in water; but, according to Merck, there is a continual slow evolution of acetic acid, causing the salt to become incompletely soluble; it is further altered by long keeping, becoming yellow and even brown. The salt is soluble without coloration in cold, strong sulphuric acid only when recently made; but at the end of a few weeks it yields a faintly colored solution, although the salt may still be white. No loss of medicinal properties through the decomposition is experienced, unless an intense yellow color has been acquired.—*Phar. Jour. and Trans.*, 1876, p. 229.

Quinetum.—Prof. Th. Husemann warns against the use of the crude mixed alkaloids ("Am. Jour. Phar.," 1876, p. 134, and 1877, p. 28), until, by careful experiments, it should have been demonstrated that it possesses decided advantages over purified chinoidin. Quinetum, besides containing resinous substances and inorganic impurities, is largely composed of cinchonia, producing unpleasant symptoms, which last longer than from equal doses of quinia or quinidia, while at the same time the febrifuge properties are diminished.—*Phar. Handelsbl.*, Dec. 6, 1876.

Fermentation of Glycerin.—A. Fitz observed that glycerin is not fermentable under the influence of the fungi of alcoholic ferments (Mucor racemosus); but when sufficiently diluted with water (20 parts) and left in contact with schizomycetes and in the presence of calcium carbonate, it undergoes fermentation, normal butylic alcohol and butyric acid being produced, besides small quantities of ethylic alcohol and a volatile fatty acid (probably capronic acid); hydrogen and carbonic acid are given off during the fermentation.—*Ber. deutsch. Chem. Ges.*, 1876, 1348–1352.

Excipient for Pill Masses.—G. Welborn has presented a paper on this subject to the British Pharmaceutical Conference, and proposes a mucilage made from ½ oz. powdered tragacanth and 2½ oz. each of water and glycerin, adding 5 drops of oil of pimento. This tragacanth excipient will keep good for several years and smaller quantities of it are required than of several of the excipients directed in officinal pills. —*Phar. Jour. and Trans.*, Sept. 23, 1876.

Cement for Aquaria.—A mixture of equal parts of shellac and powdered pumice stone, used warm, will cement glass, wood and metal. Another serviceable cement is obtained by fusing flowers of sulphur and adding finely powdered pumice stone.—*Pol. Notizbl.*, 1876, 239.

The purification of sulphate of zinc is rapidly and conveniently effected by means of permanganate of zinc. Prof. Fr. Stolba dissolves the fine salt in 3 parts of boiling distilled water and adds some pure zinc white, diffused in water. To the boiling liquid a solution of permanganate of zinc is added, drop by drop, until a faint red color is produced. When the color ceases to disappear rapidly on the addition of a little zinc white, the oxidation and precipitation of the oxides of manganium and iron has been effected, and the boiling is then continued until the color of the permanganate finally disappears, or it is deoxidized by the careful addition of some solution of the impure zinc sulphate. A few drops of sulphuric acid are added to the filtered liquid to prevent the separation of basic salt, and the purified sulphate is crystallized in the usual way.

Prof. Stolba prepares the solution of *zinc permanganate* by dissolving one part of potassium permanganate in sufficient hot water, and adding, with continued stirring, one part of silicofluoride of zinc. On cooling the mixture artificially, potassium silicofluoride separates, and the solution of zinc permanganate is poured off.—*Zeitschr. Oester. Ap. Ver.*, p. 555.

THE CHEMICAL CONSTITUTION OF BLEACHING POWDER.

By C. Stahlschmidt.

The author has expressed the view that chloride of lime may be considered as a calcium hydrate, in which 1 atom of hydrogen is replaced by chlorine; and further, that in the formation of chloride of lime, calcium chloride and water are produced; also that on bring-

ing it in contact with water it splits up into calcium hypochlorite and hydrate:

(1). $3CaH_2O_2 + 4Cl = 2CaHClO_2 + CaCl_2 + 2H_2O.$
(2). $2CaHClO_2 + \text{Water} = CaCl_2O_2 + CaH_2O_2.$

Experiments led to verification of the results of Graham, Bolley, Tschigianjanz, Fricke and Reimer, that some calcium hydrates, dried at 100°, absorbed scarcely any chlorine, whereas others under the same conditions yielded good products. Dried over sulphuric acid, the limes absorbed chlorine readily. In the latter cases, however, it is considered that a small quantity of water is still present in the hydrate, which is a necessary condition for the absorption of the gas. 0·4 per cent. of water or more in the hydrate is sufficient, so that chloride of lime may be formed at 0°, but if the hydrate has been dried at 100° to 130°, it cannot be converted into chloride of lime, unless the latter undergoes a rise in temperature. In his experiments the author worked upon quite pure materials, and with scientific exactness. A low temperature was found to be unfavorable to the formation of chloride of lime, or at least to impede it. It was found difficult to account for the indisposition of certain limes to absorb chlorine gas. A calcium hydrate with a slight excess of free water gave a chloride of lime no stronger than when a dry hydrate was used, but the former, under favorable conditions, might be made to absorb more chlorine, and finally attain a strength indicated by 39 per cent. of available chlorine. It was also found that a quick-lime, which slaked with difficulty, is less to be recommended for chloride of lime manufacture than one which slakes quickly. A lime of the former description absorbed the chlorine much more slowly, and gave a chloride of lime of only 31 to 35 per cent.

The following formula represents the formation of chloride of lime as bearing out the experimental results obtained:

$$3CaH_2O_2 + 4Cl = 2CaHClO_2 + CaCl_2 + 2H_2O.$$

That water was liberated from perfectly dry calcium hydrate, on treatment with chlorine, was made manifest by the drops of water collected in the in-let tube. In certain cases a chloride of lime is obtained containing upwards of 40 per cent. of chlorine. Göpner, by passing the chlorine through warm water of 60° to 70°, obtained a chloride of lime of 40·2, and another of 42·84 per cent. The author accounts

for this as follows: In presence of moisture a portion of the compound $2CaHClO_2$ in the already formed chloride is decomposed into $CaCl_2O_2$ and CaH_2O_2, the latter in presence of more chlorine, then giving $CaHClO_2$. The following reaction may alse take place, $2CaH_2O_2 + 4Cl = CaCl_2O_2 + CaCl_2 + 2H_2O$, and when we have the two results, $2CaHClO_2 + CaCl_2 + 2H_2O$ and $CaCl_2O_2 + CaCl_2 + 2H_2O$, the strength of equal parts of such a mixture (chloride of lime) would be 43·5 per cent. actual chlorine; in the proportion of 5: 1 = 40·5 per cent., and in that of 10: 1 = 40·0 per cent. It is concluded that, with the help of the water liberated from the dry hydrate in its conversion into chloride of lime, together with that contained in, and carried along with the chlorine gas, the already described decompositions of the chloride of lime may take place, so that the amount of actual chlorine in the product will rise. This view is supported by the fact that in a manufactured sample of chloride of lime, prepared from calcium hydrate which contained about 8 per cent. of water in excess, besides the compound $CaClHO_2$, also calcium hypochlorite occurs in varying quantities. On suspending calcium hydrate in water, and passing a current of chlorine through the mixture, till alkalinity disappeared, and all the lime had dissolved, it was found that the following equation was exactly realized: $2CaH_2O_2 + 4Cl = CaCl_2O_2 + CaCl_2 + 2H_2O$. This was proved by estimating in equal volumes of the solution, first the actual chlorine, secondly the lime. Of course the most conclusive proof of the existence of calcium hypochlorite in the chloride of lime solutions, is that Kingzett has obtained crystals of calcium hypochlorite from such solutions by evaporation, in a vacuum over sulphuric acid, or by cooling a concentrated solution below 0°. J. Kolb has observed that carbonic acid decomposes chloride of lime, liberating hypochlorous acid and leaving calcium carbonate. The author has had a sample of chloride of lime, which was thus reduced from 25 per cent. to 7 per cent. actual chlorine, the amount of calcium carbonate having risen to over 40 per cent.

The workmen can distinguish the hypochlorous acid from the chlorine by the slower action which the former exerts upon the lungs, and by its sweetish taste.—*Jour. Chem. Soc.* [Lond.], Dec., 1876, from *Dingl. Polyt. J.*, ccxxi, 243–250.

ON GALICIAN OZOKERIT AND CERESIN.

By Dr. J. Grabowsky.

(*Read before the American Chemical Society, Oct.* 5, 1876.)

Ozokerit is found in Galicia (Austria) principally in Borislaw, near Drohobyez, and Dzwiniacz, near Stanistawow. Both places are situated at the northern foot of the Carpathian mountains; the formation is miocene, and of some importance on account of its petroleum springs. The production of "earth-wax" (ozokerit) was estimated to have amounted to about twenty million of kilograms in 1875, upwards of eighteen million of kilograms coming from Borislaw alone. According to F. v. Hauer, the largest crystals of salts, which are found in connection with the ozokerit, as well as the saline springs in the petroleum-bearing strata, prove that these latter belong to the zone of the calcareous neogene formation. They contain the fluid oil as well as the solid "earth-wax" partly in more or less regular beds, partly in fissures and pockets. The exploitation is effected by means of shafts and tunnels, the former being from 40 to 80 meters deep and about 1 meter square, the latter being generally quite short on account of the very primitive method of ventilation and the great amount of gases. The shafts generally pass, first, through 8 to 10 meters of gravel mixed with boulders, then through blue loam and plastic clay, which contains numerous layers of marl, slate and sandstone. In this clay, usually at a depth of from 40 to 50 metres, petroleum springs and ozokerit are found. This latter forms lumps or layers from 1 to 3 feet thick, these lumps sometimes weighing several hundred kilograms. This native ozokerit is transparent, of pure honey-yellow color, possessing the hardness of common beeswax. More frequently, however, ozokerit is found in thin layers and small pieces, which must be separated from the gangue; the smallest pieces are only obtained by a process of washing.

Besides pure, good "earth-wax," some varieties occur which are especially distinguished by hardness and color.

The best "earth-wax" should have a pure yellow or greenish color, and be easy to knead between the fingers; this, after having been tried (melted), yields a "prime" earth-wax, which is generally used for the manufacture of "ceresin." The poorer kinds are colored black, and either very soft (containing much petroleum) or too hard, resembling asphaltum, fusing at a high temperature. After trying,

these produce an "earth-wax" which is chiefly used for the manufacture of paraffin.

Occasionally there are found pieces of ozokerit, which is very compact, as hard as gypsum, fuses above 100° C., and is dichroitic (dark green in reflected and pure yellow in refracted light).

The composition of ozokerit is best expressed by the formula C_nH_{2n}. Very little is known about its formation. It appears to me to be very probable that it has to be considered as a product of the oxidation and condensation of petroleum hydrocarbons. Only lately we have seen that hydrocarbons, as, *e. g.*, naphthalene, can form by oxidation not products containing oxygen, but dinaphthil:

$$2C_{10}H_8+O=C_{20}H_{14}+H_2O.$$

By supposing a similar oxidation of hexan or octan, we obtain compounds of the formula C_nH_{2n}, which again may condense with hydrocarbons of the marsh-gas series, and thus give rise to the formation of very complicated hydrocarbons of high melting point, *e. g.*:

1. . . . . $2C_8H_{18}+O_2=C_{16}H_{32}+2H_2O.$
2. . . . . $C_{16}H_{32}+C_8H_{18}+O=C_{24}H_{48}+H_2O.$

By this hypothesis the formation of petroleum may be reduced to an oxidation of marsh-gas, and thus the close connection between ozokerit, petroleum and coal be explained in the most simple manner.

As stated above, the crude ozokerit is separated from the gangue by melting, and worked into paraffin or ceresin. The trying is effected either by direct fire or by steam. In the former case the ozokerit is placed into iron kettles of about one and a half meter in diameter by one meter in height, melted, drawn off, and the residue boiled with water, when all the ozokerit will rise to the surface of the water. In the latter case the melting is done by steam in the same manner as with paraffin or stearin, and needs no further description. The tried ozokerit is clarified by allowing it to settle for several hours, and then poured into iron moulds. It is shipped in this form without any further packing, and in pieces of about fifty to sixty kilograms.

There are, principally, two kinds of commercial ozokerit, prime and second. Prime "wax" ought to be as free as possible from earthy impurities, and in small, transparent, greenish brown to yellow pieces; the lighter in color and the more transparent the better it is. "Second wax" is dark brown, almost apaque, occasionally containing a great deal of earthy impurities, and is generally much softer than the prime.

Both are used for the manufacture of either paraffin and illuminating oils or ceresin. The manufacture of paraffin from ozokerit is effected by distillation over direct fire, from iron retorts, with flat bottoms, containing from 700 to 1,000 kilograms. The products of the distillation are:

Benzin,	2 to 8 per cent.
Naphtha,	15 " 20 "
Paraffin,	36 " 50 "
Heavy (lubricating) oils,	15 " 20 "
Coke,	10 " 20 "

The paraffin is pressed, treated with sulphuric acid and caustic soda, filtered through paper and fine animal charcoal, and manufactured into candles. The naphtha is purified in the usual way, and the heavy oils are sometimes subjected to fractional distillation, but mostly shipped as such to Vienna.

The manufacture of ceresin consists of the removal of the impurities from the "earth wax" by the aid of sulphuric acid and animal charcoal; but only the best kinds of ozokerit are used. The different processes are kept secret, and are also protected by patents. In general, the ozokerit is melted with concentrated sulphuric acid and the residue from the manufacture of yellow prussiate, pressed, treated again with prussiate residue and filtered. 100 parts good prime "earth-wax" yield 60 to 70 parts white wax, which in its properties very closely resembles white beeswax and is called "ceresin." It is either further purified by repeated treatment with acid and prussiate residue, or colored with gamboge or alkanet, and thereby made to closely resemble common beeswax. In the manufacture of ceresin only sulphurous acid and press residues are obtained, the former of which escapes into the air, but might be utilized, thus reducing the cost considerably. The consumption of sulphuric acid in Borislaw alone is said to amount to one million kilograms a year. The prussiate residues are obtained from the lixiviation of the crude prussiate in Moravia.

The finely divided animal charcoal seems to be the active agent, since a fair ceresin may be obtained by simply treating commercial "earth wax" with bone char and concentrated sulphuric acid.

Comparatively only a small quantity of earth-wax is worked in Galicia; it is shipped principally to England, Moravia and Vienna.

The ceresin is exported in large quantities to Russia, where it is sold as beeswax; for this purpose it is melted together with a little beeswax, in order to impart to it the characteristic odor. Good ceresin is hardly to be distinguished from beeswax; the best methods are the following:

1. Ceresin is not as easily kneaded between the fingers, and becomes brittle more readily than beeswax. This test is, however, doubtful, if the sample consists of a mixture of the two.

2. Ceresin is scarcely attacked by warm concentrated sulphuric acid, whereas beeswax is completely destroyed by it. By this test the quantities of beeswax and ceresin can be determined in a mixture of both.

In many cases ceresin can be employed in the place of beeswax. It it sold at from 32 to 40 dollars per 100 kilograms in Vienna, whereas the price of the commercial earth-wax varies from 10 to 12 dollars per 100 kilograms.

The whole exploitation of the ozokerit, on account of the want of enterprising men, is in the hands of the Jewish population. It is very imperfect, and necessarily requires many changes in the mining laws.—*Amer. Chem.*, Oct., 1876.

ON AN ARTIFICIAL SUBSTITUTE FOR BEESWAX.[1]

By Gustay Hell.

The author relates that a short time ago an article was offered for yellow beeswax, which, on account of the moderate price, sold largely, and which he has determined to be entirely factitious. The appearance of this false wax is almost identical with that of genuine beeswax. In color, brittleness, fracture and adhesiveness, the difference is very slight. On the outer surface the characteristic honey-like smell, although faint, was distinctly perceptible. The freshly-cut surface, however, has not the same lustre as in genuine wax, and the freshly-fractured surfaces give a marked pitchy odor. Melted at a gentle heat the smell of honey is lost, and the pitchy odor asserts itself in an unmistakable manner; at a stronger heat it becomes intense, and persists for a long time. Having ascertained in this simple manner that the article in question was one containing a considerable proportion of pitch, the melting point and specific gravity were determined in the usual way, as follows: A glass flask, with a wide mouth, was three-fourths filled with water, and a test tube containing small pieces of wax and a

[1] "Pharm. Post," July 1, 1876, p. 218.

thermometer was sunk to the centre of the flask, and the latter lightly closed. The contents of the flask were then slowly warmed by means of a spirit lamp. When about a third of the wax was melted, the mercury in the thermometer stood at 70° C. This temperature indicated, therefore, the melting point of the wax. For the determination of the specific gravity two similar pieces of wax were allowed to sink in diluted spirit of wine, contained in a beaker, and distilled water was added, little by little, and mixed well with the spirit until the pieces floated just beneath the surface of the fluid. The specific gravity of this fluid was then determined. This was 0·962, which was taken as the gravity of the wax under examination.

In the further examination 1 gram was warmed with 10 grams of chloroform in a small flask. The solution was clear and yellow, but soon became turbid ou cooling, and an almost transparent, colorless, serous mass separated, more particularly upon the walls of the flask. Afterwards 1 gram was dissolved in 15 grams of 70 per cent. alcohol by boiling, and allowed to cool. In the clear yellow-colored solution round and half-round colorless granules were deposited. These were recovered by filtration, dried in the air and weighed; six decigrams were thus obtained. The specific gravity of these granules was 0·910. The filtrate was evaporated at a gentle heat, and left as residue a brittle resin of a beautiful dark-yellow color, weighing about four decigrams. Further, one gram of the wax in raspings was boiled, and well shaken in a solution of 1·4 gram borax in 20 grams of distilled water. A colorless mass separated on the surface of the liquid in the vessel. The liquid was turbid, but on cooling was neither milky nor gelatinous; Japan wax was therefore not present. The same experiment was made with the granules free from resin. This time the fluid remained clear during boiling and when cooled. The granules united into a cake at the top of the fluid. A sample in fine shavings was then agitated with diluted ammonia solution; a portion of the residue above mentioned, free from resin, was also treated with ammonia. In both cases the fluid remained clear and transparent, and the samples unchanged, indicating the absence not only of stearin, but also of curcumin and olein. The granular body quite free from resin, which, according to the above tests, contained neither stearin nor Japan wax, was now tested for paraffin. It had a lustrous appearance and alabaster-like transparency, yielded between the fingers without adhering, and dissolved easily and

completely in oil of turpentine and benzin, but not at all in five parts of absolute alcohol.

The examination carried out and described as above should be clearly understood to set up a claim to be exact and exhaustive. It shows the object to be determined, viz., that this product bought and sold for beeswax was no other than a mixture of about 60 per cent. of paraffin and 40 per cent. of common resin, run into cakes, and thinly covered with genuine beeswax. The examination shows also that the specific gravity alone is not sufficient for the detection of adulteration in wax, and that a product perfectly corresponding in this respect with genuine wax may nevertheless be entirely factitious and useless.—*The Chem. and Drug.*, Lond., Nov. 15, 1876.

LABORATORY NOTES.

By T. A. Edison.

1. Hard rubber or vulcanite, placed for several weeks in nitrobenzol, becomes soft and pliable like leather, and easily broken.

2. The vapor of chloral hydrate is a solvent of cellulose. I have found the corks of bottles containing the crystals eaten away to the depth of a quarter of an inch, the cork being resolved into a black semi-liquid. Certain kinds of tissue paper are partially dissolved in time, if thrown in a bottle containing the crystals.

3. A very difficult substance to dissolve is gum copal. I have found that anilin oil dissolves it with great facility.

4. Hyposulphite of soda is apparently soluble to a considerable extent in spirit of turpentine. Large crystals of "hypo" melt down to a liquid after several weeks, and if the bottle be shaken, partially disappear. The turpentine smell nearly disappears.

5. The vapors of iodine, in the course of several months, will penetrate deeply into lumps of beeswax.

6. If to a solution of bisulphide of carbon there be added twice its bulk of potassic hydrate in sticks, and the bottle be well sealed, the whole will, in two months, become an intense reddish, syrupy liquid, with scarcely any free bisulphide of carbon.

7. Some substances in solution form crystals or deposits on the sides of the bottles containing them, generally above the water line. Among such solution in 100 cc. of rain water may be mentioned a 14-gram

solution of acetate of uranium, 8-gram do. of proto-acetate of copper, 5-gram do. of acetate of morphia, 10-gram do. of formate of copper, 20-gram do. of tannate of iron. These deposits invariably take place on that part of the bottle most *exposed to light*. This phenomenon may be due to heat, but deposits or films occur in some solutions *within the liquid* as well as above it—especially noticeable with tannate of iron, the film of which adheres strongly to glass.—*Amer. Chem.*, Oct., 1876.

Menlo Park, N. J., Nov. 10, 1876.

VARIETIES.

Ergot for Hypodermic Use.—At the last meeting of the American Pharmaceutical Association, Mr. D. Benjamin stated that a liquid preparation of ergot, prepared by the following formula, had been used with advantage by several physicians, among others by Profs. Agnew and Goodell, of the University of Pennsylvania: Two troyounces of powdered ergot are exhausted by 8 fluidounces of strong alcohol, the tincture is evaporated, at a low temperature, to 2 fluidounces; when cold, mixed with 6 fluidounces of water, filtered, again carefully evaporated to two fluidounces, and preserved by the addition of 3 grains of salicylic acid. Mr. Benjamin has, since then, evaporated the liquid to one fluidounce and added two grains of salicylic acid for preservation.

Ergot for Hypodermic Injection.—Having been requested to devise a suitable preparation of ergot for the above purpose, H. P. Madsen, in default of Dragendorff's sclerotic acid, dissolved the officinal extract of ergot in equal weight of diluted alcohol (0·890), filtered, after 3 day's repose, and evaporated to sp. gr. 1·25. The liquid is now accurately saturated with carbonate of sodium and is ready for use. (Extr. of ergot, "Ph. Dan.," is made by exhausting with water, evaporating to syrupy consistency, mixing with diluted alcohol [0·890], filtering and evaporating to extract consistency).—H. M. W. from *Ny Pharm. Tid.*, 1876, p. 372.

Gregory's Syphon Filter.—("Proceedings Am. Phar. Ass.," 1876, p. 56.) Mr. G. cautions against too strong suction, lest the filtering paper be broken. This can be prevented by first stretching a piece of not too fine muslin over the tube, and over the muslin tying the filtering paper. Be the suction ever so strong, the paper will be prevented, by the muslin, from being stretched to breaking.

HANS M. WILDER.

Diætheralysis of Legrip.—(*Ibid.*, p. 61.) This is nothing new, at least the writer cannot find any difference between Legrip's method and that of Pierlot ("Am. Jour. of Phar.," 1862 [xxxiv], p. 544.) HANS M. WILDER.

Examination of Nostrums.—The "Peninsular Journal" gives, from the analysis of Jos. J. Pierron, Ph.C., the following as the approximate composition of some popular nostrums:

Perry Davis' Pain Killer.—In a bottle sold for a dollar: Spirit of camphor, about f℥ii; tinct. of capsicum, about f℥i; guaiac, ℥ss; alcohol, f℥iii; myrrh and color.

Radway's Ready Relief.—In a half-dollar bottle: Soap liniment, about f℥iss; tinct. of capsicum, f℥ss; water of ammonia, f℥ss; alcohol, f℥ss.

Flagg's Relief.—In a bottle sold for half a dollar: Oil of cloves, about f℥i; oil of sassafras, f℥ii; spirit of camphor, f℥iss.

Chamberlain's Relief.—In a bottle sold for thirty-five cents (approximately): Tinct. of capsicum, f℥i; spirit of camphor, f℥¾, guaiac, ℥¼; color tincture, to make two fluidounces.

Hamlin's Wizard Oil.—In a bottle sold for a dollar there are (in approximate proportion): Spirit of camphor, f℥i; spirit of ammonia, f℥ss; oil of sassafras, f℥ss; oil of cloves, f℥ii; chloroform, f℥ss; oil of turpentine, f℥ss; alcohol, to make about five fluidounces.

Kellogg's Red Drops.—A bottle, sold for half a dollar, contains (in approximate quantities): Spirit of camphor, f℥ii; spirit of origanum, f℥¼; oil of sassafras, f℥¼; oil of turpentine, f℥ss; color tincture, to make three and a fourth fluidounces.

Substitution of Bromide of Cadmium for Bromide of Ammonium.—Dr. G. A. Wheeler, of Castine, Me., reports the cases of two ladies, who were poisoned by taking some salt from a bottle which had the label of Wm. Conrad, Paris, with the designation, *bromure d'ammonium*. After several hours' suffering, both patients, having been treated with white of egg, sweet oil, milk, etc., gradually recovered. Prof. Carmichael, of Bowdoin College, established the identity of the salt with cadmium bromide. Evidently the wrong label had been attached to the bottle at the factory.—*Bost. Med. and Surg. Jour.*, Oct. 12, 1876.

On the Decomposition of Solution of Iodide of Potassium. By M. Bastaudier.—The author has experimented with a view of testing the conclusion to which other observers have come, that the decomposition noticed in a solution of iodide of potassium is due to solar light, and in no degree to the influence of the atmosphere. According to him, this conclusion is not sound. He finds that the solution in question is not affected by the solar rays when air is excluded; is scarcely affected by the same in an atmosphere of oxygen and nitrogen only, but is decomposed to varying extents in ordinary air containing traces of acids, particularly carbonic acid. This result may be due to the liberation of hydriodic acid.—*Chemist and Druggist* [Lond.], Dec. 15, 1876, from *Jour. de Pharm. et de Chim.*, Sept., 1876.

Oil of Aleuritis triloba. By Dr. C. Oxamendi.—The *Aleuritis triloba* is a large euphorbiaceous tree, growing between the tropics, and particularly in India, where it is called by the English *candle tree* or *candleberry*. The oil is known in Ceylon as *kekune*. According to Griffith, the fruits are employed as aphrodisiacs, being

taken in small quantity in the fresh state. M. Bouchardat attributes to the oil valuable purgative properties; the dose is 30 grams, or even (as M. Retano de Gresandy states) 60 grams. M. Oxamendi confirms these observations as regards the purgative properties of the oil, but is of opinion that 15 grams is a dose sufficiently large for an adult, and 8 grams for a child. The effects on the intestines are the same as those of castor oil. It is not at all disagreeable to take, and has a nutty taste. It acts in about three hours without producing pain or colic. M. Oxamendi thinks that the action is due to a special resin. He recommends the following mixture:

	Grams.
Oil of Aleuritis triloba,	15
Powdered gum arabic,	12
Water,	12
White sugar,	15

—*Ibid.*, from *Jour. de Thérap.*

Albuminate of Santonin and Sodium.—According to Pavesi, a combination of santonin and of bicarbonate of sodium with soluble albumen forms a valuable vermifuge. The preparation is made in the following manner: 1 part of santonin, 4 parts of sodium bicarbonate and 2 parts of dried soluble albumen are warmed with a sufficient quantity of water at 60° to 70° until all are dissolved, and then evaporated to dryness at a very gentle heat. The albuminate of santonin and sodium forms brilliant white scales, soluble in water. The mineral acids precipitate santonin and albumen, with disengagement of carbonic acid. The reasons for which Pavesi gives the preference to this combination over the use of santonin alone are the following: The after effects of santonin, among others, that of yellowness of vision, are entirely obviated. The preparation is not decomposed in the stomach, because the bicarbonate of sodium in the combination retains the santonin in solution, the coagulation of the albumen is prevented, gently purgative sodium salts are introduced into the body, and finally, by the disengagement of a small quantity of carbonic acid, an active digestion is produced.

The properties claimed for this preparation should be examined by more extended researches.—*Chemist and Druggist* [Lond.], Nov. 15, 1876, from *Jour. de Pharm. de Genève*, July 5, 1876.

Volumetric Estimation of Alcohol. By T. T. Monell.—If a cobalt salt be added to an alcoholic solution of sulpho-cyanide of ammonium, a deep blue coloration is produced which suddenly vanishes on dilution with water, and re-appears on further addition of alcohol. Given the same volume, spirit of a certain percentage always gives precisely the same intensity of color with a standard blue solution in whichever order alcohol or water may be added. It is possible in this way to determine quickly by a volumetric process even so little as one-fourth per cent. of alcohol in a mixture. A measured quantity of the dark blue standard fluid is placed in a cylinder, and a mixture to be tested is added, until the color is reduced to that of a strip of pale blue glass; the volume of this pale colored fluid will be the greater as the mixture is richer in alcohol. This volume, once determined, will always remain

the same, and the percentage noted on the cylinder may afterwards be read off without further trouble. The standard fluid is always prepared with the spirit of the same strength and compared with the same strip of blue glass. The nitrate of cobalt is the salt found most convenient for this purpose. Colored brandy may be tested directly; in this case the tint is not blue, however, but green. Two cylinders are therefore necessary, one for the test and one to give the desired tint in conjunction with the blue glass. The cobalt solution may be either neutral or slightly acid, but should contain as little water as possible.—*Chemist and Druggist* [Lond.], Dec. 15, 1876, from *Amer. Chemist.*

MINUTES OF THE PHARMACEUTICAL MEETING.

JANUARY 16th, 1877.

The meeting was called to order by the President, Dillwyn Parrish. In the absence of the Registrar, A. W. Miller was appointed to act in his place.

Prof. Maisch presented the 24th annual volume of the Proceedings of the American Pharmaceutical Association, which was accepted with the thanks of the College.

Prof. Remington presented on behalf of Jos. J. Brown, now in California, some very handsome specimens of Eucalyptus globulus, having fruits and flowers attached to them.

A. W. Miller read a paper on adulterations (see page 57), giving the method by which the so-called Oregon balsam of fir had been manufactured, a specimen of which was presented. Prof. Maisch expressed satisfaction in having the source of this article cleared up. He stated that his previous experiments had convinced him that it was a fictitious combination of rosin and turpentine, but that he had not been able to recognize the flavoring ingredient. Prof. Maisch remarked that years ago itinerant venders had sold either pure salicin or mixture of salicin and quinia in proportions adjusted to the price realized, in various sections of the United States, under the garb of pure sulphate of quinia. He also spoke of the occasional adulteration of balsam of copaiba with castor oil, which is not very readily recognized, both being soluble in alcohol. Prof. Wayne had suggested the use of petroleum benzin, as this dissolves copaiba quite readily, but castor oil very sparingly. This test is, however, fallacious, as mixtures of equal parts of castor oil and copaiba dissolve freely in benzin. A more reliable method is to distil off the essential oil, and then to examine the residue. Pure copaiba makes a transparent mixture with aqua ammoniæ, while castor oil will be indicated by a soapy appearance. The paper was then referred to the editor.

Prof. Maisch read a lengthy paper on the use of the metrical system in prescriptions (see page 49). He exhibited copies of the Greek and Mexican pharmacopœias; of the new appendix to the "Swiss Pharmacopœia;" of "Dorvault's l'Officine" and of the Pharmaceutical journals "Revista Pharmacia" and "La Emulacion," in all of which weights are employed, as indicated in the paper.

James T. Shinn desired to know what means were adopted in Europe in order to dispense with the use of graduated measures in prescriptions. Prof. Maisch informed him that a special scale, one beam of which is often furnished with a rider, is usually reserved for this purpose. After the vial has been tared, the prescribed liquids are then weighed directly in it.

A communication from Hans M. Wilder was also read, advising a recalculation of the pharmacopœia quantities into parts by weight, and suggesting that it be left optional with physicians to prescribe either in grams alone or by grams and cubic centimeters, just so that they indicate it plain and legible. He called special attention to the necessity of great care in the marking of the decimal point, the position of which may often be a matter of life and death, as far as the patient is concerned. Prof. Maisch stated that the same subject will claim the attention of the New York College of Pharmacy this week. Dr. Pile expressed a fear that it would prove difficult for physicians to adjust their doses by weight, on account of the differences in the specific gravity of liquids. Prof. Maisch replied that practically only three classes of liquids deserved consideration in this connection, namely, water, syrups weighing one-third heavier, and oils weighing one-tenth less than water; with most tinctures and fluid extracts, if prescribed as if they were of the same specific gravity as water, the difference would hardly be greater than the increase in bulk by dissolving solids, which physicians have very generally overlooked, but in those cases, where great exactness is desired and the precise size of the patient's teaspoon or tablespoon is known, the difficulty can be overcome by the addition of an adjuvant to make up a designated quantity. In answer to an inquiry, Prof. Maisch stated that several American medical societies had recently advised their members to use the metric system in prescribing.

James T. Shinn thought that the looseness of physicians in the matter of doses justified the retention of the present system of measuring liquids as a matter of convenience. Prof. Maisch regarded the appliances for weighing in pharmacies as productive of far more accurate results than the present means used by druggists for measuring. He considered the uniformity of the metric system all over the world as the most important argument for its introduction. Even in comparatively narrow glass tubes there is so much liability to error in reading off the space occupied by the liquid which is measured, that in analytical work a special indicator is made use of so as to reduce the apparent variation to its minimum. This error is enormously augmented in proportion as the diameter of the surface of the liquid increases. E. M. Boring alluded to another error due to capillary attraction in tubes of narrow diameter.

A. W. Miller suggested that physicians might write a formula for one single dose, leaving the adjustment of the diluent to the pharmacist, in order to make up the conventional teaspoon or tablespoonful dose. The physician could then readily prescribe any convenient number of doses by the usual subscription: *Misce tales doses no.* ——. All the much dreaded labor of calculation and adjustment would thus be thrown on the druggist, who has certainly more leisure to do it carefully and accurately in the seclusion of his prescription department than the physician at the bedside of the patient.

Prof. Remington referred to the action of the last committee on the revision of the "Pharmacopœia," who had received positive instructions to abolish all measures of capacity, but on account of the obstinacy of some of their members, retained the majority of them. He saw no possible way of evading the issue, and therefore advocated taking the step at once, and doing it completely, without resorting to any half-way measures. He thought it wrong to wait for physicians to make a beginning. Prof. Maisch enumerated the various nations who had adopted the metric system for use in medicine, showing that it was already in use on nearly the whole continent of Europe, in all of civilized America, excepting the United States and Canada, and in the empire of Japan. According to information obtained by him from the medical attachés of the Japanese Commission during the late Exposition, the entire system of medical and pharmaceutical instruction in Japan is modeled after the German method; they even use the same Latin terms and pronounce them in accordance with the usage prevalent in Germany, and use the French weights exclusively.

Prof. Remington exhibited a small copper still, invented by E. T. Prentiss, of this city, who calls it an alcohol reclaimer. It is intended chiefly for strengthening and purifying alcohol, for which purpose a column is connected with it containing a number of perforated diaphragms, through which the vapor is compelled to pass. Prof. Remington had tried the still, and had found that the strength of alcohol could be increased to a certain degree by inserting a thermometer and keeping the liquid continuously at a low temperature. The price of the still was stated to be $15.00. E. M. Boring expressed a fear that all the present stills, when used merely for recovering the alcohol, required too high a temperature and thus injured the product, for which reason he was in the habit of simply evaporating the alcohol without attempting to recover it. A. W. Miller suggested that the same still could be readily modified so as to dispense with the column whenever it was desirable to do so; a low temperature could then be maintained by the use of a water-bath.

Dillwyn Parrish presented Japanese persimmons, preserved in sugar, for inspection. They were of very large size, and resembled in appearance the sugared fruits sold by confectioners.

Prof. Remington presented some very valuable specimens donated to the College by the late Prof. Joseph Carson shortly before his decease. Some of the articles were specially intended for the Cabinet, having formerly been used by Prof. Carson in illustrating his lectures at the College. The specimens embrace genuine Sumatra camphor, from Dryobalanops camphora, obtained by Prof. Carson through a relative in the East; pure Burgundy pitch, nutmegs preserved in alcohol, Japanese camphor, Chinese calomel in the form of flat crystals, hog gum from Jamaica, Japanese tobacco, varieties of India opium from Malwa, Benares and Patna; also, a cake of Smyrna opium, well freighted with bullets. The most valuable acquisition of all consisted in a very beautiful Chinese pipe for smoking opium. The stem of the pipe is completely covered with real tortoise-shell, and an ivory mouthpiece is fitted to it. The pipe is furnished with four earthenware bowls, an alcohol lamp of peculiar construction, several boxes of extra choice opium and a number of curious instruments intended for cleaning the pipe. The process of smoking the

drug was illustrated by Prof. Remington. On motion, the Registrar was directed to acknowledge the donation, and to express the thanks of the College to Prof. Carson's family.

Prof. Remington called attention to the handsome case of specimens received from F. Crace Calvert & Co., of England, to be divided between the University of Pennsylvania and the Philadelphia College of Pharmacy. Owing to the lateness of the hour, the examination of the specimens was postponed to the next meeting, when additional donations from the Austrian, English, Dutch and Italian Departments of the Exposition will also be ready for inspection.

ADOLPH W. MILLER, Registrar *pro. tem.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

The Massachusetts College of Pharmacy has met with a very serious loss by fire. Since the beginning of the present year the College had occupied the third floor of the Mayhew School Building, on Hawkins street, in Boston, which was erected in 1847, and was abandoned for school purposes in June last. The second floor was unoccupied, and the ground floor was fitted up for the ward-room of Ward 7. The lecture-room of the College was about 30x50 feet, and around it stood cases containing the specimens of drugs and chemicals, all of which were destroyed. A lecture was delivered on the evening of January 22d, and a fire was left in the two furnaces in the basement as was customary. The fire, which was discovered about 3 o'clock the next morning, began, it appears, by the hot-air pipes directly over the furnaces, and ran upwards to the front rooms of the second and third floors, and through the cold-air boxes placed between the two floors to the rear part of the building, where less damage was done.

The accommodations were given to the College by the city of Boston, the owner of the building. The total loss to the College is estimated at about $3,000, which is but partially covered by insurance.

We sincerely hope that our friends will not be dismayed by this sudden loss, but that they may succeed in making temporary arrangements for the present, so as to continue the current course to its close. The losses, though serious, we trust are not irreparable, and the hearty good will and the determined energy for which the Boston pharmacists and druggists are known, will overcome them.

The Boston Druggists' Association held its annual meeting and banquet on the afternoon and evening of January 24th, when the following officers were elected:

President, William J. Cutler, of the firm of Cutler Bros. & Co.; Vice Presidents, Dr. Thomas L. Jenks and Nathaniel J. Rust, of Rust Bros. & Bird; Secretary, William F. Horton, of Cheney, Myrick, Hobbs & Co.; Treasurer, S. A. D. Sheppard, of S. A. D. Sheppard & Co.

At the banquet the newly-elected President occupied the head of the table, and on either side of him were seated Mr. Theodore Metcalf, the retiring President, and Mr. Daniel Henchman, a gentleman between eighty and ninety years of age, who has been engaged in the trade longer than any other man in Boston, and is the oldest living druggist in the State. In 1802 he first got hold of the pestle and mortar, and in 1814 went into business where he is now located, at the corner of Chamber and Cambridge streets, no alteration having been made in the place during that period.

Alumni Association of the Philadelphia College of Pharmacy.—The stated monthly meeting was held January 4th, 1877, President Kennedy in the chair, 43 members present.

Thirty specimens of crude drugs, chemicals and pharmaceutical preparations were submitted for the examination of the students, and excited much interest, being, as a rule, recognized by the majority. They were donated to the Alpha Phi Society.

Dr. Miller stated that white lead was used as an adulteration for rubber used in the manufacture of nipples, tubing, etc., and suggested possible lead poisoning. He had heard it stated that as much as 80 per cent. was known to have been used.

Mr. Kennedy advised the use of a small quantity of Haematoxylon in making tincture of kino, as it prevented the subsequent gelatinization. Mr. Boring used alcohol as a menstruum, with a similar result.

It was stated that Miss Clara Marshall, a former student of the College, had recently been elected to the chair of Pharmacy in the Women's Medical College of this city—lecturing Wednesdays at 12 M, and Thursdays and Saturdays at 11 A.M.

WALLACE PROCTER, *Secretary.*

Cincinnati College of Pharmacy.—At the regular meeting, held January 10th, the following officers were elected to serve for the ensuing year: President, Dr. R. M. Byrnes; Vice President, Dr. T. L. A. Greve; Recording Secretary, A. W. Bain; Corresponding Secretary, Louis Schwab; Treasurer, Chas. Faust; Trustees, Dr. T. L. A Greve, F. L. Eaton, H. H. Kœhnken, John Weyer.

The Society of the Apothecaries of Berlin held a meeting November 21st, 1876, Dr. Schacht in the chair. Mr. Schering called attention to the increasing demand of *hydrobromate of quinia* for subcutaneous injections, for which purpose its absolute freedom from barium bromide is necessary. The quinia salt is soluble in 50 parts of cold water; but a supersaturated solution which will keep for some time may be prepared by dissolving the salt in 5 parts of hot water, and adding gradually 10 to 12 parts of water.

He also spoke of *dialyzed salicylic acid*, which is entirely freed from uncrystallizable impurities by dialysis, and yields pure and stable compounds. *Salicylate of zinc*, made with such an acid, is readily obtained in handsome white crystals. *Salicylate of sodium*, in voluminous white crystalline scales, which, in contact with air, neither become moist or reddish or acquire the odor of carbolic acid; its solutions in water and alcohol are clear, neutral and remain unaltered if protected against dust.

Mr. Arnd spoke on the *examination of fixed and volatile oils* by means of Abbe's refractometer, whereby differences are detected which are scarcely observable by means of the polariscope, two or three drops of the liquid being required for the test. Artificial oil of mustard was found to have a refraction of 1·5275 and a dispersion of 15°, while the volatile oil obtained from the seed had a refraction of 1·5325 and a dispersion of 17°. For expressed oil of almonds the refraction was found to be 1·9705 and the dispersion 15·5°; for oil of poppy seed 1·9753 and 15°. The *refractometer*, which is easily handled, has been constructed by Prof. Abbe, of Jena.

Pharmaceutical Society of Great Britain.—At the Pharmaceutical meeting held December 6, a note by Samuel Elliott was read, suggesting a *glyceritum croci*, for which the following formula was given: Saffron 1 drachm, glycerin 9 fluidounces. Mix and macerate for seven days; pour off the bright liquor; press the remainder through calico into another vessel, and again strain it; mix the two liquors and make up the whole to 9 fluidounces with glycerin. Its odor is much stronger than that of syrup of saffron.

Mr. Greenish referred to the astonishing power of glycerin of retaining various substances in solution, which were not precipitated after a time as from tinctures and syrups. Mr. Greenish had made a preparation of saffron in glycerin some 18 months ago which had kept uncommonly well.

For the preparation of *Hydrargyrum cum cretâ*, Mr. A. Bottle proposed a deviation from the "Pharmacopœia" process to the extent of substituting for the slow process of trituration in a mortar active agitation in a wide-mouth glass bottle, by which means the B. P. quantity (3 oz.) may be prepared and the metal minutely subdivided, with an expenditure of very little, if any, more time and labor than is required to be devoted to the preparation of a tincture. (Essentially the same process was suggested by W. H. Hewson, of Augusta, Ga., and published by Dr. E. J. Coxe, of New Orleans, in "Amer. Jour. Phar.," 1850, p. 317; see also a paper by W. W. Stoddart in "Pharmac. Jour. and Transact.," 1856, January 1).

Mr. C. L. Betty read a paper on *Oleate of bismuth*, stating that one part of oxide of bismuth is ground very fine and four parts of oleic acid are gradually incorporated with it. The mixture being placed in a suitable vessel, is subjected to a temperature of nearly its boiling point, then allowed to digest, with frequent agitation, at a temperature of about 60° during four days, or until it solidifies. The result is pharmaceutically, a plaster, which melts readily in contact with the skin, is bland to excoriated surfaces and penetrating by its limpidity. Further experiments will be necessary to prove the most reliable mode of its manufacture, as under apparently similar conditions results have not hitherto been uniform.

Mr. John Williams read a paper *on some reactions of the glycerol of nitrate of bismuth* (see "Amer. Jour. Phar.," 1877, p. 23). A solution of 20 per cent. of crystallized nitrate of bismuth, in glycerin, may be made, and is best effected in the cold; if much heat is employed the glycerol, when diluted with water, will make a milky solution, at any rate after a few hours. The property of bearing dilution with water, without producing a turbid solution, appears to diminish by keeping.

The diluted solution does not bear boiling, but, when so treated, deposits a basic salt, not afterwards soluble in water. The most interesting reaction is that caustic potassa or soda, added to the solution, diluted with water, causes a white precipitate, which is perfectly soluble in the alkali, but not in ammonia, the solution being miscible with water in all proportions, but yields a white precipitate with alcohol, which is not again soluble in water; by boiling a somewhat colored precipitate is obtained. Glycerin appears to play a part somewhat similar to that taken by citric acid in the liquor of the "British Pharmacopœia," or to tartaric acid, and probably other organic acids which will afford solutions with bismuth.

Mr. W. Martindale read a paper on *crystallized hyoscyamia*, in which it is stated that the apparently amorphous hyoscyamia of the London market is, in reality, minutely crystalline; he also gives Thibaut's process for obtaining the alkaloid crystallized (see "Proceedings Amer. Phar. Ass.," 1876, p. 354), and mentions some observations affirming the prolonged action of the alkaloid on the pupil.

Mr. A. W. Gerrard reported on eight samples of *glycerin*, one of which contained lead and butyric acid, and of the remaining seven four might be termed good, while the other three upon being burnt gave evidence sufficient to warrant him in characterizing them as very impure and unfit for medicine or domestic use.

Mr. Gerrard also reported of a *crystalline deposit from tincture of galls*, which he found to answer to the description given in "Watt's Dictionary" of the characters of *ellagic acid*.

Mr. J. C. Thresh read a note on *Capsaicin*, the active principle of Cayenne pepper, which he purified by dissolving in potassa solution, precipitating by carbonic acid, and dissolving the washed and dried precipitate in hot petroleum, from which it crystallized after several days. The crystals were dissolved in alcohol, the solution diluted with water and spontaneously evaporated until crystals were obtained, which, analyzed by Dr. Buri, of Strassburg, gave results agreeing with the empirical formula $C_9H_{14}O_2$.

EDITORIAL DEPARTMENT.

Conversion of Apothecaries' into Gram Weights.—Most of our readers are aware that within a few years the metric system of weights and measures has been introduced in many of the European countries. In medicine and pharmacy the change had to be effected gradually, principally on account of the older practitioners, who had become so habituated to the use of the old apothecaries' weights, that, for them, it was difficult to change suddenly to the new system. The burden of the labor was, therefore, in Germany, thrown upon the pharmacist, and, by a decree of the Minister of Ecclesiastic, Educational and Medical Affairs, bearing date of August 29, 1867, it was ordered that from and after the first day of January following every prescription sent to a pharmacy had to be prepared by the use of the metric weights, while the physician was allowed to prescribe either by the old or new system. A table, a copy of which is now before us, was authoritatively published at the same time, according to which the pharmacist was required to con-

vert the grains and ounces into grams, and *indicate these values upon the prescription*, so that, upon repetition, it could always be compounded alike. It seems to us that by a concerted action between the national medical and pharmaceutical associations a similar arrangement might be made, and, after agreeing upon a table of values, from a certain fixed date, apothecaries might be required to dispense all prescriptions by the metric weight only, without regard to the values indicated in the prescription. By following such a course the older physicians would gradually accustom themselves to the change, and, after a while, prescribe as readily by metric weights alone as they now use troy weights and wine measure. At the present time, and more particularly since the publication of the German "Pharmacopœia," in 1872, we have been informed that physicians, in Germany, may be said to prescribe solely in the metric system, the younger members of the medical profession having been educated in it, and those previously in practice having gradually acquired the knowledge and habit of prescribing by grams.

The table, as promulgated in Prussia, is not applicable to the weights used in this country, since the apothecaries' pound in that country equalled only 350·761 grams, while the troy pound weighs 373·202 grams, or, in other words, one troy ounce is equal to 510·68 (instead of 480) Prussian grains. In the few extracts which we give from this table our main object is to show that the rounding off of the values, by conversion into another system of weights, has not been considered to be productive of such serious results as has been suggested probable in this country, by the adoption of a similar course.

The fractions of a grain and its multiples, up to 15 grains, were calculated by taking the weight of the grain to be = ·06 grams, except that the following weights were rounded off as indicated gr. viii=·5; gr. ix=·55, and grs. xiv=·85. Of the higher values we select the following:

Gr. xvi=1·0; ℈i=1·25; ℥ss=2·0; ℈ii=2·5; gr. xlviii=3·0; ℈iiss=3·12; ℥i=3·75; gr. lxxii=4·5; ℥iss=5·57; ℈v=6·25; ℥iiss=9·5; ℥iii=11·0, etc., the remaining values being estimated, as nearly as convenient, by taking the value of the scruple and drachm as stated, the ounce and its multiples being valued at the rate of 30 grams.

If it is remembered that the weight of a fluidounce of water of apothecaries' measure, at 15° C., very nearly equals (within 3·5 grains) one ounce of apothecaries' weight, as formerly used in Prussia, it will be evident that the Prussian *weights*, as indicated in the official table referred to above, will be almost the absolute equivalents for the corresponding measures of water, as employed in the United States, and upon this basis we have calculated the following table, giving all values in the approximate gram values. The table, it may be premised, follows that given by our "Pharmacopœia," and for the liquids three standards have been taken, namely, waters, fluid extracts and tinctures prepared with diluted alcohol, all having approximately the density of water; liquids lighter than water, spec. gr. ·85 to ·95 and including the spirits, tinctures made with alcohol, fixed and volatile oils; and liquids heavier than water, spec. gr. 1·25 to 1·32, including glycerin and the syrups. The few liquids, like ether and chloroform, varying to some extent from the densities here given, are so rarely prescribed as an addition to mixtures that it is believed that the table here given will, practically, in all cases serve the purpose as a

Table for converting Apothecaries' Weights and Measures into Gram Weights.

Troy Weight.	Grams.	Apothecaries' Measures.	Grams for Liquids		
			Lighter than Water.	Spec. Grav of Water.	Heavier than Water.
Grain $\frac{1}{15}$	·004	Minim 1	·055	·06	·08
$\frac{1}{12}$	·005	2	·10	.12	·15
$\frac{1}{10}$	·006	3	·16	·18	·24
$\frac{1}{8}$	·008	4	·22	·24	·32
$\frac{1}{6}$	·010.	5	·28	·3	·40
$\frac{1}{4}$	·016	6	·32	·36	·48
$\frac{1}{3}$	·02	7	·38	·42	·55
$\frac{1}{2}$	·03	8	·45	·5	·65
$\frac{2}{3}$	·05	9	·50	·55	·73
1	·07	10	·55	·6	·80
2	·13	12	·65	·72	·96
3	·20	14	·76	·85	1·12
4	·26	15	·80	·9	1·20
5	·32	16	·90	1·0	1·32
6	·39	20	1·12	1·25	1·60
7	·45	25	1·40	1·55	2·00
8	·52	30	1·70	1·90	2·50
9	·59	35	2·00	2·20	2·90
10 (℈ss)	·65	40	2·25	2·50	3·30
12	·78	48	2·70	3·0	4·00
14	·90	50	2·80	3·12	4·15
15	1·00	60 (f ℥i)	3 40	3·75	5·00
16	1·05	65	3·60	4·0	5·30
18	1·18	72	4·05	4·5	6·00
20 (℈i)	1·3	80	4·50	5·0	6·65
24	1·5	90 (f ℥iss)	5·10	5·6	7·50
30 (℥ss)	1·95	96	5·40	6·0	8·00
32	2·1	100	5·60	6·25	8 30
36	2·3	120 (f ℥ii)	6·75	7·5	10·00
40 (℈ii)	2·6	150 (f ℥iiss)	8·50	9·5	12·50
45	3·0	160	9·00	10·0	13·30
50 (℈iiss)	3·2	180 (f ℥iii)	10·10	11 25	15·00
60 (℥i)	3·9	210 (f ℥iiiss)	11·80	13·0	17·50
70	4·55	240 (f ℥iv)	13·50	15·0	20·00
80 (℈iv)	5·2	f ℥v	16·90	18·75	25·00
90 (℈iiss)	5·9	f ℥vss	18·60	20·75	27·50
100 (℈v)	6·5	f ℥vi	20·25	22·5	30·00
110 (℈vss)	7·1	f ℥vii	23·60	26 25	35·00
120 (℥ii)	7 80	f ℥viii (f ℥i)	27·00	30·0	40·00
150 (℥iiss)	9·75	f ℥ix	30·40	33·75	45·00
180 (℥iii)	11·65	f ℥x	33·75	37·5	50·00
240 (℥ss)	15·5	f ℥xii (f ℥iss)	40·50	45·0	60·00
300 (℥v)	19·4	f ℥xiv	47·25	52 5	70·00
360 (℥vi)	23·3	f ℥ii	54·00	60 0	80·00
420 ℥vii)	27·2	f ℥iiss	67·50	75·0	100·00
480 (℥i)	31·1	f ℥iii	81·00	90·0	120·00
℥ii	62·2	f ℥iiiss	94·50	105·0	140·00
℥iv	124·4	f ℥iv	108·00	120·0	160·00

Minims and Drops.—At the present time, when the introduction of the metric system of weights and measures is so widely discussed in the United States, it becomes of importance to guard against erroneous statements gaining a foothold, which might prejudice the inexperienced against a system which, after its successful introduction, promises to be of such great advantage. It appears to have escaped general notice that the two tables of the "U. S. Pharmacopœia" giving the relation of the old and metric weights differ, though slightly, in the value of the gram, which difference, however, becomes apparent only for the values of one ounce and over, amounting for 12 troyounces to less than 4 centigrams, quite insignificant in its practical bearing. Different values are again given in a paper, the original of which we have not seen, but which we find copied in the "Virginia Medical Monthly" for December. The paper, which is entitled "Practical Illustration of the Metric System," was taken from the "Medical Register for New England," and has for its author Francis H. Brown, M.D., assisted by Dr. Robt. Amory, of Brookline, and Prof. G. F. H. Markoe, of Roxbury. The most conflicting statements are given as to the relative value of the different weights and measures, as, for instance, the gram is stated in two contiguous places to be equal to 15·4323 and to 15·4349 grains. This difference, however, does not vary much from the difference in the "Pharmacopœia" tables, and is practically of no account. It is different, however, with other errors, which are by far too serious, though quite inconsistent, so that they appear to demand some notice here by placing two statements side-by-side:

fʒi=3·69 cubic centimeters;—for water fʒi=60ɱ or 3 grams.

Since a cubic centimeter of water at its greatest density (4°C.) weighs 1 gram, the incorrectness of the above statement is quite apparent, even if the different gravity of water at the medium temperature (15°C.) is not neglected.

But when the statement is made that there is no relation between the density of a fluid and the weight of a minim, it is so clearly incorrect that it should need no refutation. A table given with the paper makes the bold statement that 20 minims of chloroform weigh only ·370 gram, or about one-third of the asserted weight of water, the latter being in reality only about three-fifth the weight of the former liquid, though not as given in the table.

It was found that the table, together with several sentences referring to it, have been taken from Dorvault's "l'Officine" (edit. 1872, p. 190), the translator having made the slight (?) mistake of translating *drop* (goutte) by *minim*. Dorvault describes several dropping-glasses, and then states that "the apparatus is considered adjusted if, at 15°C., 20 *drops* of distilled water weigh 1 gram, at least within 5 centigrams." The following is the approximate weight of 20 *drops* of different liquids at a temperature near 15°C. (We give only a few from the lengthy table):

Syrup (35°B.),	1·111 grams.	Oil of peppermint,	·400 grams.
Ammonia (23°B),	·909 "	Oil of turpentine,	·385 "
Glycerin,	·837 "	Chloroform,	·370 "
Sulphuric acid (sp. gr. 1·84),	·700 "	Absolute alcohol,	·311 "
Croton oil,	·410 "	Sulphuric ether,	·263 "

An inspection of this table shows that there exists no relation between *the weight of a drop of a liquid and its density.*"

We have similar tables enough of this so-called approximate measure by drops. A table giving the relation of the weight and measure of the drops of different liquids was prepared nearly fifty years ago by the late E. Durand, and published in the first volume of this journal (see also Griffith's "Formulary" (3d edit., p. 29). Those who desire to be informed of the different size of drops are referred to the tables in "Parrish's Pharmacy," 4th edit., p.p. 79, 80, where it will also be found that a difference of from 30 to 100 per cent. in the number of drops for the same measure is by no means uncommon, as obtained with the same liquid under different conditions.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Proceedings of the American Pharmaceutical Association at the Twenty-fourth Annual Meeting, held in Philadelphia, Pa., September, 1876. Also, the Constitution and By Laws and Roll of Members. Philadelphia: Sherman & Co., Printers, 1877. 8vo, pp. 909. Price, cloth, $7.50.

With the view of keeping the size of the volume within convenient limits, the Executive Committee has adopted a smaller type than had heretofore been used; but, notwithstanding this, the volume before us exceeds by ten pages the preceding issue.

As usual, a considerable portion of the book—392 pages—is occupied by the excellent report of Prof. Diehl on the Progress of Pharmacy, giving, in a condensed form, the results of the investigations and observations in pharmacy and the collateral sciences during the year closing with June 30th, 1876; the following 48 pages being the reports of the various committees, and the next 120 pages the papers read at the last meeting, and of most of which we have given a brief abstract in our October number. A list of books and pamphlets on pharmaceutical subjects, published during the year, has been prepared by Prof. Diehl, and is followed by the minutes and discussions, which, with the President's address, occupy 142 pages. Nearly as voluminous is the report of the Committee on the Centennial Exhibition, which gives a pretty complete list of the articles having special pharmaceutical interest which were exhibited at Fairmount Park; the last 160 pages being the list of exchanges, Constitution and By-Laws, roll of members and index, an alphabetical list of members being printed for the first time with this volume.

A very excellent likeness, printed from a steel engraving, of the late John Milhau; a well-executed lithographic plate of 13 vesicating beetles, nearly all indigenous to this continent; and very correct plates of Eriodyction Californicum, the new remedy for pectoral complaints, and of Rheum officinale, one of the sources of Chinese rhubarb, embellish the volume, besides 50 wood-cuts, in illustration of apparatus, drugs, chemicals, etc.

Taking everything together, the present volume is very creditable to the Association, and forms not only the largest and handsomest, but, we believe, likewise one of the most useful, when compared with its predecessors. The complete and well-

arranged and digested report on the progress of pharmacy, giving an annual synopsis of the pharmaceutical literature of the civilized world, is alone worth the whole amount of the annual dues, and all pharmacists and druggists who take an interest in the business of their choice, should connect themselves with this Association, which already has its members in 38 States and Territories of the Union, in Canada and some Central American States and West Indian Islands.

The volume will be mailed by the Permanent Secretary, John M. Maisch, on receipt of the price.

The Aromatic Group in the Chemistry of Plants. By Albert B. Prescott, F. C. S., Professor of Organic Chemistry in the University of Michigan. 8vo, pp. 23.

An interesting review of this important group of chemical compounds, reprinted from the "Proceedings of the Ann Arbor Scientific Association for 1875–76."

Boston Society of Civil Engineers. Report of Standing Committee on the Metric System of Weights and Measures. Boston, December, 1876. 8vo, pp. 12.

The society mentioned in the title has been very active in promoting the adoption of the metric system in this country, and has been in correspondence with other societies, boards of trade, manufacturers, etc., who would be affected by the proposed change. The report before us gives not only the favorable but also the unfavorable action and views of the parties named. We learn, also, that Sweden has adopted the metric system, its obligatory use to date from 1889, in order to avoid actual compulsion and to prepare all technical books in the new system. Russia is likewise moving in the same directions.

Regarding its practical introduction in this country, the committee conclude their report with the following recommendation:

"After advising so many other people to use the metric weights and measures, we think it would be a graceful thing for the members of this society to do something themselves towards actually adopting them. We think that the place to begin is in writing scales on plans. We recommend, therefore, that upon every plan that has its scale shown by a graduated line, indicating feet, miles, etc., a second line should be drawn as a scale of meters. This requires very little additional labor, does not injure the plan for present use and may enhance its future value, shows what is now the lawful standard of the United States and how long the meter is as compared with the foot, and it gives the draughtsman his first lesson as to the difficulties that lie in the way of the metric system. This practice can perfectly well be adopted by a very few persons, or even by a single individual, unsuppoted by the rest of the community."

Medicinal Plants; being Descriptions with Original Figures of the Principal Plants employed in Medicine, and an Account of their Properties and Uses. By Robt. Bentley, F. L. S., etc., and Henry Trimen, M. B., F. L. S. Philadelphia: Lindsay & Blakiston. Price, per part, $2.

Parts 13, 14 and 15 of this valuable work contain the colored plates and descriptive accounts of the following plants: Aconitum napellus, Tenospora cordifolia (an East Indian tonic, antiperiodic and diuretic), Mucuna pruriens, Inula helenium, Anacyclus pyrethrum, Artemisia pauciflora (yielding santonica), Strychnos nux-

vomica, Delphinium staphisagria, Potentilla tormentilla, Ecbalium elaterium, Convolvulus scammonia, Lavandula vera, Nepeta cataria, Marrubium vulgare, Erythroxylon coca, Cytisus scoparius, Prunus laurocerasus, Eucalyptus globulus, Cephaelis ipecacuanha, Rosmarinus officinalis and Laurus nobilis. As in the preceding numbers, the illustrations are superbly executed, the text is clear and comprehensive, and not the least important feature is the copious references to the literature on the various subjects in the English language.

OBITUARY.

PROFESSOR JOSEPH CARSON, M.D., died in Philadelphia December 30, at the age of 68 years. He was elected to the chair of Materia Medica in the Philadelphia College of Pharmacy in 1836, and held that position until 1850, when he accepted the professorship of Materia Medica in the University of Pennsylvania, from which he retired in the spring of last year, in consequence of impaired health. The deceased had been editor of the "American Journal of Pharmacy" from November, 1836, until July, 1850, during a portion of which time he was assisted by Prof. Robert Bridges and afterwards by the late Prof. Wm. Procter as Associate Editors.

He took an active part in the revision of several editions of the "United States Pharmacopœia," and was honored with the position of President of the last decennial convention for its revision, which assembled in Washington in 1870. He was an active member of various scientific societies, in several of which he served as officer.

Dr. Carson contributed a number of valuable papers on subjects of the materia medica to this journal, most of which appeared during his occupancy of the editorial chair; and in 1847 he published a valuable work, entitled "Illustrations of Medical Botany," which was embellished with 100 handsomely illustrated lithographic plates.

He was a man of great mental and social qualities, and a successful teacher of his favorite branch of science.

CHARLES W. BADGER died in Newark, N. J., after a brief illness, January 17th. He had been for many years engaged in the drug business in that city, and took a prominent and active part in the organization and objects of the local pharmaceutical associations of his State. He was a member—and the first and thus far the *only* life member under the present by-laws of the American Pharmaceutical Association. As a man of the highest integrity, sound judgment and good business habits, he was highly respected and honored with various positions of public trust; as a mark of respect, the pharmacists and druggists of Newark closed their places af business during his funeral on Saturday, January 20.

HENRY A. HUGHES, the oldest member of the American Pharmaceutical Association in the State of Kentucky, died in Louisville Nov. 21 last, aged 55½ years. He was born and raised in Paris, Bourbon county, Ky., and commenced business in Louisville in 1847.